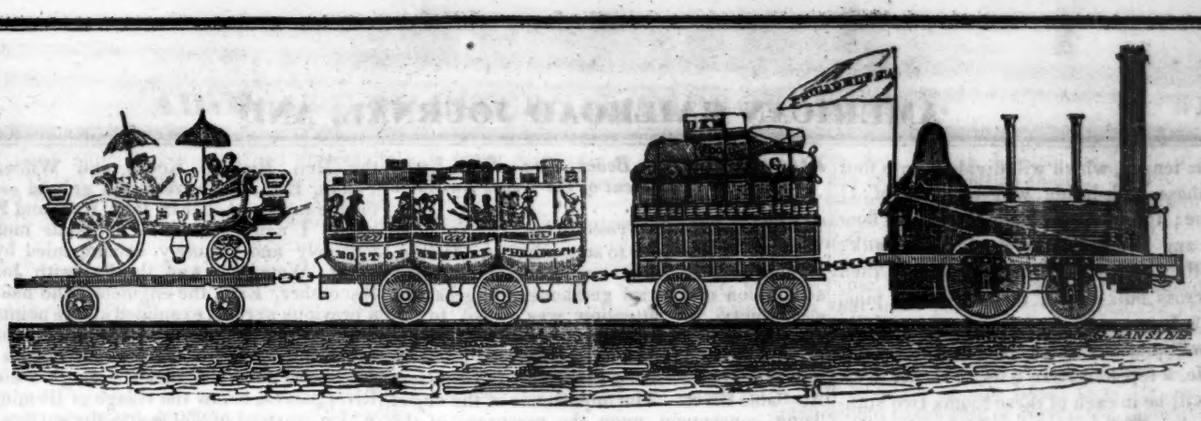

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT No. 35 WALL STREET, NEW-YORK, AT THREE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

D. K. MINOR, Editor.] SATURDAY, FEBRUARY 1, 1834. [VOLUME III.—No. 4.

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AMERICAN RAILROAD JOURNAL, &c.

NEW-YORK, FEBRUARY 1, 1834.

☞ Those of our subscribers to whom bills are enclosed, will do us a great favor by remitting the amount by mail, or by an *early* private hand, as prompt pay only, can sustain the Journal. Subscribers residing in the city will be called upon in the course of the ensuing week.

To those who have so promptly and liberally remitted for the present, or third, and in some cases for the fourth volume, and in almost every instance free of postage, we tender our thanks and best wishes.

We acknowledge our obligation to those who render us so much aid by frequent interesting communications ; yet we wish them and others to recollect, that they are at the same time doing more for the public than for themselves, or for us. A continuance of their favors is earnestly requested. Communications on any of the various subjects treated of in the Journal, are respectfully solicited.

The Saratoga and Schenectady Railroad Company have declared a dividend of *four* per cent., payable on the 10th of February. For a particular account of that road, its cost, condition, &c., see page 51 of this number.

The following evidence of the value of lime as a preservative of timber exposed to the weather, or embedded in the earth, is from an Engineer of great experience. It affords additional evidence, if any were necessary, of the correctness of the theory of our esteemed correspondent G., as published in our last. As the preservation of timber used for railroads is a matter of so much importance, we would recommend that a thorough test should be made by some of our railroad companies, where their rails come in contact with the earth. It might be used to great advantage, we think, in the construction of railroads on the plan of Elisha Johnson, Esq., as adopted on the Buffalo and Black Rock railroad—a description of which will be given in our next. This plan is, we think, peculiarly adapted to many parts of this country, especially where timber is cheap, and where it is essential to accommodate the inhabitants of the country through which it passes, and who would be best accommodated by using their own teams upon the road—a measure which would render railroads a convenience to individuals, and neighborhoods through which they pass, as well as profitable to the stockholders ; and at the same time remove one of the greatest objections, in the minds of many, to railroads—*monopoly*.

The plan of Mr. Johnson, as explained to us, consists in two longitudinal sills of, or about, twelve inches diameter, with one side made flat, embedded in, and the worked side even with the surface of the earth, which is made level between, and on the outside of, the sills ; upon which is to be placed a covering of 2½ inch plank, 7½ feet in length ; and upon the plank, and over the centre of the sills, is to be laid a 4 inch scantling to receive the iron, 2½ by ⅝ inch, which is to be secured by spikes passing through the iron, scantling and plank into the sill beneath, thereby connecting and securing the whole by the same operation.

This plan will undoubtedly find favor, if any mode can be devised, at small expense, to preserve the timber ; and *lime*, we have good reason to believe, will be found to answer that purpose. If so, we may have railroads at small cost, and in many places where they are not now even anticipated.

A plank covering, properly laid down, may be made water tight, so as to preserve the *earth beneath always in a* DRY *state*, which will, of course, according to McAdam's theory, render it competent to sustain any burthen that ordinary business, either with animal or steam power, may bring upon it.

To the Editor of the American Railroad Journal :

Sir—I am induced to communicate a fact corroborative of the opinion of your correspondent G., in the 3d number of the 3d volume of your Journal, that lime is a preserver of timber. Some fifteen years ago a friend of mine removed a decayed mill trunk in order to replace it with a new one. The trunk had been laid under gruond, and when it was covered with earth, a few scattered lumps of lime were accidentally thrown upon it. On its removal, it was discovered that every part of the wood which was in contact with lime was as perfectly sound as it was when it was first laid, whilst every other part was more or less decayed. Indeed, those parts exhibited a freshness and soundness which were truly remarkable.

Xenophon.

Capt. Davis Embree, of Cincinnati, Ohio, has furnished us with the following description of an improvement in low water boats, that he is about to put in operation on the Ohio. He says he can lessen the draught of water at least *one-fourth*, while he retains the usual strength, speed, and convenience for freight and passengers. He says he will at the same time introduce the principle of the *life-boat*, and render it almost impossible to sink the boat by snags, rocks or waves.

The boat he is about to build will be 135 feet in length, and 24 feet wide ; the hull will be 3 feet 3 inches deep. The beam of the boat will be shaped like the bowl of a table spoon, so as to rise over the water. Twenty-six feet from the stern there will be a recess on each side, of 6 feet for the wheels to work in. The boat will be reduced there to 12 feet wide. Aft of the wheels there will be a clean run, and transom stern. This narrow part is intended to bear up the wheels and other machinery, and to furnish room for a stern castle, with its capstan, anchors, and other rigging, so essential on that part of the boat, as well as on the bow, when a boat is run in low water. By this arrangement, the wheels of the boat can be thrown out of gear, as well as other side wheels ; they have all the advantage of working in eddy water, or a counter current, of the stern wheels. They have not the propensity to *break down* the stern of the boat, which is always attendant on wheels placed *behind* a boat. That part of the hull, which would otherwise be weak, in consequence of the recesses, will be supported by the cylinder timbers, and the bulkheads under them.

The hull of the boat will in the first place have three main bulk-heads, running nearly

its whole length, which will divide it into four parts: these bulk-heads will be made of 1¼ inch pine; they will be notched over the floor timbers and be fastened to the bottom plank; they will extend to the deck: there will then be ten cross bulk-heads, made of inch pine, placed 9 feet apart, made also water-tight, which will make forty water-proof rooms, 6 feet wide, 9 feet long, and 3 feet 3 inches deep. There will be in each of these rooms two stanchions, placed 3 feet apart, and 3 feet from the bulk-heads, upon the floor timbers, and under the beams. Thus there will be a bearing at every 3 feet in every direction throughout the boat, between the bottom and deck. Then, to secure it more firmly, there will be 160 tie-bolts passed through the bottom, along side of the bulk-heads, and through the deck. This arrangement will give such great strength, that the timbers may be small; they will be made of selected young white ash, as tough as whip stocks. The floor and upright timbers will be but 3½ inches square. The beams (except for the boilers and wheels) will be 2¼ inches thick and 4½ wide, bent over the main bulk-heads, and made to extend about 1 foot over the sides of the boat, to form a narrow guard. The bottom plank will be 2 inch oak; the side plank the same; the deck will be 1¼ pine; the timbers or scuppers, to drain the bilge water to the pump, will be made by grooves in the bottom plank, so as not to weaken the timbers. The floor or bottom of the boat will be nearly flat, the nuckle nearly square, the sides will flare but 4 inches outwards. There will be small hatches into each room of the hull, to go into it, to stop scuppers or leaks, when required, so that if a snag run through the boat in any direction, so as even to destroy ten of these rooms, there will be still thirty left to buoy up the boat. She cannot sink but by great negligence. This is perhaps the most important feature presented by the plan; but when, in addition to this, we have a boat of full strength and speed, and containing all the usual convenience for freight and passengers, improved from 25 to 30 per cent. in draught of water, we have all that could be reasonably looked for. The boat is supposed to draw but 15 or 16 inches of water with her wood and water aboard, and then it will take nearly six tons to sink her one inch.

The hull will not be suitable or convenient to carry engine, freight, or passengers, within its body. It will be a single buoyant mass, made of light and strong materials; it will be a mere *float*. The first or lower deck will be appropriated for engine and freight, the upper deck for passengers; the cabins will be 16 feet wide, with an outer guard on each side 4 feet wide; the ladies' cabin will be 18 feet long; the main cabin will be 33 feet; the office and pantry 6 feet, and the room for crew and deck passengers 30 feet, with a guard in front. The engine will be of common construction; the boilers will be placed near the middle of the main bearing part of the hull. There will be two boilers, 40 inches diameter, 19 feet long; two flues, each, 15 inches in diameter; the cylinder will be 16 inches diameter, with 4½ feet stroke of piston: it will have a slide valve and puppet cut off. The water wheels will be 13 feet in diameter, with a bucket 6 feet long.

Report of Ephraim Beach, Esq., Civil Engineer, to the President of the Great Au-Sable Railroad Company.

To John T. Norton, Esq., President, &c.

Sir,—I beg leave to state, that on a late excursion to Port Kent and Keeseville, at the solicitation of several gentlemen of great respectability, my attention was called to an examination of the importance and practicability of a railroad communication from Port Kent into the interior, along the Valley of the Great Au-Sable River. The importance of the object being consequent upon the resources of the country to be accommodated, I gave to that subject such attention as time and circumstances permitted; the result of which may be briefly stated as follows:

From an official statement of the situation of that district in 1831, it appears that there were then in operation, and in a state of forwardness near completion, in and near the valley of the Great Au-Sable and on its tributary streams, about 70 forges, (each fire being considered a forge,) 2 furnaces, 4 grist mills; together with extensive rolling and slitting mills, chain-cable factories, nail factories, breweries, tanneries, &c., besides numerous smaller mechanical establishments appendant to, and the necessary and natural concomitants of, the larger operations.

The extensive forests, especially within the range of the State road, abound with all the various kinds and qualities of timber characteristic of the country; but that which predominates, and is most valuable for timber, is the Norway and white pine.

I cannot better describe the extensive minerals of this prolific mineral region, than by the following extract of the official report of 1831:

"Within three miles of the Au-Sable River, there are two extensive iron ore beds; from one of which the ore is raised by a steam engine. At the other, the ore is separated by Browning's Patent Machine. These ore beds sell from 30 to $40,000 worth of ore annually."

It is stated that there are also numerous other ore beds near, and accessible to the Great Au-Sable River; as also the Port Kent and Hopkinton State Road, some of which are in partial operation, with strong indications of being inexhaustible in quantity, and not exceeded in quality by the best in the world; which has been abundantly established at various establishments, especially at the Eagle Furnace in Albany. In a word, almost every mountain furnishes indications of iron ore in this peculiar region, some interspersed with other valuable mines in partial developement, abounding with correspondent mill sites, affording an ample supply of water power to any extent commensurate with the growing interests of the country. To communicate an idea of the growing industry of the country, I am enabled to state, from the most respectable authority, that, in the district intended to be embraced in the report referred to above, there are *now* in successful operation more than one hundred forges; and that saw mills and other manufacturing establishments have increased in proportion; and it is probable that Agriculture will follow in the train, and keep pace with the openings made by the collier and lumberman. Mercantile establishments are also interspersed through the country, co-extensive with its growing prosperity. From the foregoing premises, the estimate of business for a rsilroad will be nearly as follows, viz.:

100 forges, averaging 50 tons each per annum —500 tons; 42 saw mills, at 2 tons lumber each per day, 300 days—25,200; wood, and other incidental transportation—10,000; iron ore, for exportion, say—5,000; ascending trade, merchandize, plaster paris, &c. &c. 1-8th of decending—5,650; total—50,350 tons.

From the other manufacturing establishments procuring their raw materials from the products of the country, but little additional revenue can be expected upon the road terminating at Keeseville.

In examining the route, accompanied by the Hon. Richard Keese and William R. Peters, Esq., I traversed the ground selected for the railroad between Port Kent and Keeseville. I again examined the route more extensively and minutely, accompanied by Col. C. M. Watson. And thirdly, with John N. Macomber, Esq., the engineer, who had made a previous survey, examined all the points with his levelling instruments; and with him and Richard Keese, Esq. measured the depth of the chasm between the rocks through which the River passes, below the village of Birmingham, which, instead of 250 feet to the surface of the water (as has been erroneously stated), we found it at the *table rock*, a short distance above the celebrated high bridge, a great natural curiosity, to be only 105 feet; which satisfactorily demonstrated the correctness of the account given by Mr. Macomber in his survey of the elevations from Port Kent to Keeseville. I am therefore enabled to state, from my own personal observation, that a route can be obtained from Port Kent to Keeseville, on which a railroad may be cons ructed with great facility and economy, and upon a grade which, after leaving Port Kent, need not in any case exceed an ascent of 25 feet to a mile.

In the plan of construction. I would recommend ascending the hill at Port Kent to the level of the Pine Plane above, (which is about 80 feet above the level of the wharf), by an inclined plane at an angle of elevation not exceeding five degrees from the horizon, which should be graded for; and upon which should be laid a double track railway, with a drum at the head; from which to suspend and take down, and up, the descending and ascending trade; which drum must be connected with a brake to regulate the speed.

From the head of the inclined plane to Keeseville, the route should be carefully surveyed, and properly located; the timber upon the line cut off or grubbed, as the case may require, and cleared 33 feet wide; and all tall trees (which by falling might injure the road,) should be cut down—the ground graded fifteen feet wide for a single track, except near the high bridge and at Birmingham, where the grade should be widened, and a double track laid for the accommodation of those, who, from business, or curiosity to examine the sublime scenery and cataracts in the immediate vicinity, may be induced to stop—as well as turnout places for cars meeting to pass each other. Timber being the staple commodity of the country, and can be procured of an excellent quality, at a reasonable price, should by all means be preferred for the superstructure.

The inclined plane at the commencement of the road at Port Kent, cannot be objectionable; inasmuch as there can be no doubt of there being at all times sufficient descending trade to draw up the ascending—of course, the plane will be self-acting, dispensing with all expensive and hazardous machinery; and if at any future period, the ascending trade should increase to the extent, that the descending shall be insufficient to preponderate, a small but durable stream of water, which passes near the contemplated location of the head of the plane, can with a trifling expense be introduced upon it, and made available in propelling the descending train.

Estimate of Cost of Construction.—For grading the first three miles from Port Kent, at $2000 per mile, $6000; 4th mile, passing high bridge and Birmingham, and crossing the river, 4000; 5th mile, from Birmingham to Keeseville, 3000. Total, $13,000.

Cost of one mile of superstructure, viz. 10,560 lineal feet white pine setts, 6 by 8, at 3 cents a foot, $316 80; 1760 cedar ties, 8 feet long, 6 in diameter, 6 cents, 105 60; 3520 wedges, one cent, 35 20; 10,560 lineal feet Norway pine, 6 by 6, 3 cents, 316 80; 18 tons iron rail plates, 2 by 1-2 inch, at $45, 810 00; half ton spikes, $80; half ton connecting plates, $60, 140 00; labor putting down superstructure, 960 00. Total, $2684 40

Cost of 5 miles of superstructure, $13423 00. For double and lateral tracks, add half a mile superstructure, $1342 20.

Cost of railroad from Port Kent to Keeseville, $27,764 20; for engineering, superintendence, &c. &c., 15 per cent., 4164 63; 20 transportation cars, at $100, is 2000 00; 2 passenger cars, at $500, 1000 00. Cost of road and vehicles of transportation, ready for operation, $34,928 83.

From the account of the resources of the annual tonnage to and from the navigable waters for the Au-Sable Valley, is 50,850 tons; but as it is probable that some portion of the business will be transacted through other channels, and to guard against possible errors, we will assume only one half as a safe calculation for the business of the railroad—say 25,425 tons, at the low rate of 6 cents per ton per mile, $7,627 50; 40 passengers per day (20 each way) 312 days, at 25 cents a passenger, 3,120 00. Total, $10,745 50.

Suppose the perishable materials of the superstructure to require renewing once in ten years, and the cars once in five years, is equal to an annual expense of $1,597 92; superintendents, horses, drivers, &c., 2,000 08. Total, $3,597 92—leaving for the nett annual proceeds of the road, $7,149 58, applicable to the payment of dividends to the stockholders, or upwards of 20 per cent. per annum on their investment.

It will be perceived that the transportation cars (could they be kept in constant employment, would be competent to do four times the business calculated, should they be loaded but in one direction. And one passenger car would do six times the business calculated; yet I think it would be proper to make such provision, to be prepared for any emergency.

Although a railroad from Port Kent to Keeseville would alone be a profitable investment, it would also be an entering wedge to an extension up the valley of the Au-Sable, at least to the Forks (15 miles from Port Kent), which would greatly increase the business on the lower part of the road, and be of incalculable advantage to the manufacturers, in addition to conveying their products to market, by increasing the facilities for the delivery of wood, coal, ore, and other materials, to their establishments; and probably at no distant period form an important link in the contemplated chain of railroad communication between Boston and Ogdensburgh. I am, respectfully, your humble servant,

EPHRAIM BEACH,
Civil Engineer.

Newark, Nov. 23, 1833.

Report of the Committee on the Affairs of the Saratoga and Schenectady Railroad. Presented 4th December, 1833.

The following report of the condition, prospects, &c. of the Saratoga Railroad Company, was furnished us several weeks since, but was accidentally omitted.

To the President, &c.

The Committee appointed by a Resolntion of the Board of Directors, held the 28th of September, 1833, to investigate, &c., the affairs of the Company, submit the following Report:

That soon after their appointment, two of your Committee, accompanied by an intelligent gentleman, who has acted in the capacity of Secretary, repaired to the spot, and after several weeks of unremitting attention to the important trust confided to them, have at length been enabled to bring their labors to a close, so far as relates to the present administration of the Road, and also in reference to its future prospects. The Committee, in order to lay before the stockholders a faithful and correct expose of the present condition of the concerns of the Company, together with a prospective view, have carefully and thoroughly examined the various points which the Report embraces, and have the satisfaction to believe that the results will prove gratifying to all those having an interest in the welfare of this incorporation.

The duties of the Committee, as they conceive, were necessarily divided into two distinct parts. Firstly: The actual condition of the Road, the examination of the accounts for moneys received and disbursed in conducting its active operations from the opening, the appointment of suitable agents, &c., regulating the affairs of the Road in all its various branches, and estimating its present and future resources.

Secondly: In relation to the contracts for completing the different sections of the whole line of Road, their fulfilment, the expenditures for construction, examination of vouchers, and every thing touching the faithful performance of the duties assigned to the agents, engineers, &c. As this part of the investigation would, from the great mass of papers to be examined, consume more time than was at first anticipated by the Committee, they have confined themselves, in their present Report, to the first branch of the inquiry.

The Saratoga and Schenectady Railroad Company was incorporated in February, 1831, with a capital of $150,000, with the privilege of increasing it to $300,000. The amount was soon subscribed, and the company organized the same year. The road was commenced about the 1st of September, 1831, and was so far constructed by the 12th of July, 1832, as to be opened for the partial transportation of passengers: the whole line of the rail, however, was not laid till late in the spring of this present year. At the time of applying for the charter, it was contemplated that a cheap structure would have answered the purposes required, but it was subsequently determined, from the prospect of a greater amount of business than was at first anticipated, that a more permanent and substantial one was advisable, both on the score of economy as well as utility. By a report of John B. Jervis, Esq. chief engineer of the Company, presented at a meeting of the Board of Directors, held on the 16th of May, 1832, containing an estimate of the probable cost of the Road, it appeared that the farther sum of $100,000 would be required over and above the amount of the capital at that time, to complete the Road, including the necessary appendages to put it into active operation. It was accordingly resolved, at a subsequent meeting of the Board, held 18th of May, that the capital stock of the company should be increased that amount, which was all subscribed for, making the entire capital at that time, $250,000, and subsequently, in the fall of last year and spring of this, the capital was increased to $285,000. This sum was considered amply sufficient to place the Road in the most perfect condition; but unforeseen circumstances have caused some farther expenditures to complete the Road, and procure the necessary means to conduct its future operations to advantage. The aggregate amount of expenditures for constructing the Road, appears to be $297,237. The Committee have the pleasure to announce its entire completion, and that it is now in excellent order, and hereafter will only require for ordinary repairs, according to the estimate formed, the annual expenditure of $3,000.

The Road commences at Schenectady, where it joins the Mohawk and Hudson Road, at its termination on the western inclined plane, passes the canal over a bridge, through the city of Schenectady, then over the Mohawk river, through the towns of Glenville. Clifton Park, Ballston, and the village of Ballston Spa, and terminates in the central part of the village of Saratoga Springs. The route is almost an uninterrupted level, there being no greater inclination than sixteen feet in a mile.

The Committee, in order to be made thoroughly acquainted with the state of the Road, employed a respectable mechanic of this city to inspect all the masonry, walls, culverts, bridges, &c., and to furnish the Committee with his views in relation thereto. His report is presented. Since then, the unfinished work mentioned therein has been completed.

The Company are now amply supplied with every thing necessary for transporting, the ensuing year, three times the number of passengers that have passed over the Road the present year, and also for transporting, when the contemplated increase of wagons are provided, 20,000 tons of merchandize and produce.

The receipts of the Road, from its commencement to the 30th of November, inclusive, amount to $16,990 92.

The Committee, in the progress of their duties, were desirous to place the affairs of the Company on such a solid footing as would best secure the interests of stockholders, and have therefore adopted such measures as they believed calculated to produce so important a result. Their attention was particularly called to the imperfect regulations that existed in conducting the active operations of the Road, and also in relation to its financia lconcerns; they considered an improvement would be effected by having but one general agent or superintendent over the whole line of Road; in the place of two that were then acting with equal powers, and have accordingly appointed Mr. John Costigan, recently of this city, a gentleman disengaged from all other business, and willing to devote his whole time and attention to the concerns of the Company, possessing, in the opinion of your Committee, all the requisite qualifications to fulfil the duties of that office.

In adverting to the financial department, the Committee would observe, that although the funds of the Company were intrusted in the hands of those of unquestionable responsibility, yet it was believed a change might be made that would be more in conformity to what is adopted by other incorporations in relation to this subject, and prove more satisfactory to stockholders.

The Committee have accordingly concluded an arrangement with the Schenectady Bank to receive the gross amount of moneys belonging to the Company, (from whatever source they may be derived,) to be drawn for according to the regulations that may be hereafter adopted by the Board.

The Committee, believing that a system of collections, differing from that which has been hitherto pursued, might be formed, that would prove more beneficial, have adopted it accordingly.

In deliberating on the foregoing subjects, your Committee were led to consider the advantages that would result by establishing a set of by-laws, to govern the proceedings of the Company, which they herewith submit for the consideration of the Board.

The attention of the Committee was next turned to the subject of the future prospects of the Company, which occupied a considerable porton of their time; and they are gratified to find it presents a very encouraging aspect. In addition to the summer and local travel, there is, in the opinion of your Committee, a wide field opening in the direction of the North and West, for extensive business in the transportation of passengers and freight. There have been various estimates formed as to the amount of northern business travel; but it has been ascertained, from authentic sources, that at least 30,000 persons pass each way, in the course of the year, during the opening of navigation on Lake Champlain, who have heretofore taken what is termed the "River Route;" and, from the measures already pursued by the Committee in order to secure this travel, it is confidently believed that a large proportion of this number will in future select the route of the Railroad. The ordinary time to perform the journey, by the stage route, from Whitehall to Albany, is from 12 to 14 hours. By the Railroad, it could be easily accomplished in 10 hours, including the necessary stoppages; fur-

nishing a much more easy and expeditious mode of conveyance.

The Committee have given publicity to the permanent arrangements of the Road for the transportation of passengers, &c., by advertising in the newspapers in the northern and western parts of this state, and in Vermont and Canada; which means of making known to the public the facilities offered by the Railroad appear to have been heretofore, in a great measure, overlooked. The Utica and Schenectady Railroad, now about being constucted, it is believed, will materially add to this branch of business. The Committee have received a written communication from the Commissioner of that road, expressive of his views on the subject.

An arrangement has been completed with the Mohawk and Hudson Railroad Company for a continuous line of transportation, for passengers and freight, between Albany and the Springs; thereby avoiding the inconvenience and loss of time heretofore experienced in changing the carriages and baggage cars at Schenectady. The utility of this arrangement will be duly appreciated by those who have passed this route previous to this regulation: it has given very general satisfaction, and the beneficial results have been already witnessed by your Committee.

The transportation of merchandize and produce has also claimed particular notice and attention. It appears to be divided into two branches, viz.: the exports, consisting principally of the products of the forest, sawed timber, and other articles enumerated, which gives the amount of 19,150 tons; the imports, consisting of foreign merchandize for the consumption of the surrounding country, and of products from the west, the most important item of which is plaster, amounting itself heretofore to at least 3000 tons per annum. This will be augmented in a very great degree; as previous to the construction of the Railroad, this article, from its heavy cost of transportation, was introduced but to a limited extent. From the facilities now afforded, many proprietors are induced to cut the wood and clear the land for the purposes of culture; and the time is not far distant when this portion of the country, hitherto almost secluded from participating in the benefits of commerce and agriculture, will rise into notice.

Already the transportation of goods from the Hudson river has commenced under the most favorable auspices, being conveyed in much less time, and at a cheaper rate, than via canal. Within the last month, freight destined for Saratoga, which was formerly conveyed in the canal to Schenectady, and then placed in freight wagons, is now taken from the foot of the eastern inclined plane of the Mohawk and Hudson road, at the wharf, and conveyed to Ballston and Saratoga in the same wagons; and is also returned in the same manner. It is to be observed, that a considerable portion of the line of this Railroad is distant 12 miles from any canal, which gives it a decided advantage in the transportation of freight, particularly in the article of wood for fuel, which hitherto could only find a home market to a limited extent, the cost of the ordinary mode of conveyance precluding it being sent to a more distant one.

The Committee do not consider it as any exaggeration to say, that the receipts from transportation of freight alone, which has heretofore received but little attention from the Company, may be made to pay all the expenses of the general operations of the Road; leaving the receipts from passengers as net profits.

The Committee were gratified to see, on the 21st ultimo, the article of anthracite coal conveyed from the Hudson river, at the foot of the inclined plane, over the two Railroads to the vicinity of Ballston Spa, to be used for manufacturing purposes, for which large quantities will be required.

(To be concluded in our next.)

THE GENESEE AND ALLEGANY CANAL.

[Continued from page 4.]

Report from the Canal Commissioners, pursuant to the act entitled "An act to provide for the Survey of certain Canal Routes therein mentioned." Made to the Assembly March 6, 1826.

To the Legislature of the State of New-York:

The Canal Commissioners, in obedience to the provision nof an act entitled "an act to provide for the survey of certain canal routes therein mentioned," have caused surveys and examinations to be made of the most eligible routes for navigable communications, in the following places, to wit:

From the Seneca lake to the Chemung river.

From Syracuse to Port Watson.

From Chenango point, by the town of Norwich, to the Erie canal.

From the valley of the Unadilla to the Erie canal.

From the Cayuga lake to the Susquehannah, near Owego.

From the Erie Canal in the county of Herkimer, to the St. Lawrence.

From the Erie canal at Rome, by Boonville, to Ogdensburgh.

From the Erie canal at Rome, by Camden, to Ogdensburgh.

*From Rochester to the Allegany river, by various routes.

*From the Erie canal to the Allegany, by Batavia.

*From the Erie canal to the Allegany, by the valley of the Conawanga.

*From Portland on lake Erie, to the head of Chatauque lake.

From the Champlain canal to the Vermont line, by various routes.

From Gravesend Bay, through the bays on the south shore, to the east end of Long Island.

From Schoharie creek to the valley of the Catskill.

Messrs. Geddes, Roberts, Thomas, Hutchinson, Young, Whippo, and Sargent, were the engineers employed to survey the above mentioned routes; their reports, maps and estimates, are herewith transmitted, and will furnish the legislature with the necessary information on the subjects to which they respectively relate.

The foregoing surveys, and the one submitted a few days since, of the route from "Sharon or near thereto, to the tide waters of the Hudson," are all the routes comprised in the above mentioned act, excepting a short route from Rochester to lake Ontario.

SAMUEL YOUNG,
HENRY SEYMOUR,
WILLIAM C. BOUCK,

6th March, 1826.

GENESEE CANAL.—A Canal from Rochester to Genesee will pass over a country so favorable to the making one, that notwithstanding the valuable river navigation now used between these places, an artificial canal will undoubtedly be accomplished. The route of a canal may follow a track almost as direct as a road along the river.

From the upper end of the feeder to Geneseo, will be about 27 miles, the making of which will cost less perhaps than any 27 miles of canal ever did, exclusive of lockage. The rise from the Erie canal to Squawkey hill is 68 feet, to Geneseo feet.

At Squawkey hill, a smooth surface gives place to the narrow defile, the deep chasm, and the frowning precipice.

From below Smith's mills in the town of Nunda above the great falls, [the river enters at country of tremendous gulfs, passing down cataracts, and through rapids, falling 453 feet to Gardeau flats, thence running rapidly to Squawkey hill with a fall of 76 feet more.

To make a canal which will have in it this 529 feet of lockage, it must pass the first falls below Smith's mills in the river bed, defended by masonry until it gains the table land immediately below, where the face of the country will admit of its leaving the brow of the gulf below, and by some deep cuttings through points of hills, pass on to a very smooth faced country of clay soil, over which a canal can be conducted down the hill to the river near Mount Morris.

Sixty-six locks, of 8 feet lift each, will have to be placed in a space not exceeding nine miles, allowing something more than a furlong to each lock.

Following up the river from Smith's mills to the mouth of Black creek 22 miles, the valley is free from high precipitous rocky shores, but some obstructions by slip banks of clay occur in several places. To secure against those slips is sometimes difficult, and great disasters are often occasioned by them. Excepting these threatening slips, the valley is favorable to the making a canal in it. The lockage in this 22 miles is 162 feet, not quite an eight feet lock to a mile.

Following up the valley of Black creek, another rapid rise takes place. In three miles there will be 17 eight feet locks: some rocks on the falls on Black creek, but they are of a loose texture, and their removal will not be expensive. They are a yellow sand stone, in which shells of numerous varieties are embedded.

From these falls seven miles to the summit, the surface is smooth, but the earth is filled with loose stones, producing most unpleasant roads along the valley.

The whole rise from the Erie canal to the summit is 981 feet. On this summit, between Genesee and Allegany waters, there lies a swamp, about two miles in length. This swamp, which is in some places open, and in some places timbered, drains into Black creek, and into Oil creek. It will be profitable to cut down this summit eight feet in the deepest place, and the lockage is so calculated.

This summit pound must be extended down the north side of Oil creek valley to its junction with Ishua creek, where, from a feeder of two miles in length, the whole of the Ishua creek can be received into the summit level.

The length of the summit will be eight miles; it will pass down the Oil creek valley with facility, not running much on the face of the steep hill, although the junction of the streams is 41 feet below said summit level.

The whole fall to Allegany at the mouth of Olean creek, is 78 feet—whole lockage ascending and descending, 1,059 feet.

The length of canal to be made from the upper end of the feeder near Rochester to Olean, will vary little from 100 miles. The lockage is equal to 132 eight feet locks on this canal of 103 miles, measuring from the Erie canal to Allegany river. The Union canal, now making in Pennsylvania, between the Susquehannah and Schuylkill, is 75 miles long, with 90 locks. As 75 is to 90, so is 103 to 123, exceeding the proportion to the Union canal by 9 locks.

A passage from the Ohio valley to the Genesee valley is here 1488 feet above tide level, and is less elevated than any passage that has been examined, either to the Potomac or to the Susquehannah valleys. The canal proposed from the Conamau to Juniata, through a tunnel four miles long, is (taking "the level that has been assumed) 1831 feet above the tide,"* an elevation of 343 feet more than the pass to Genesee valley, which will be without tunnel or deep cutting.

But from examinations made by Mr. Whippo, there is a passage found up the Conawanga valley, the summit 724 feet above the level of lake Erie. Add 570 feet, the elevation of lake Erie above the ocean, and said summit stands but 1294 feet above tide level—194 feet lower than that of Oil creek and Genesee. Mr. W. gives the fall to Warren, in Pennsylvania, in 24 miles, 132 feet. Pittsburgh being 756 feet above tide level, it results, that there is but 406 feet rise from Pittsburgh to Warren. The length of a canal from Buffalo to Warren he

* See report, &c. of the commissioners, &c. printed at Harrisburgh, 1825, page 40.

makes 89 miles. In this 89 miles the lockage will be 724 feet up, and 132 down, equal 856 feet, making 107 eight feet locks in 89 miles. The lockage on the canal here proposed, when compared with its length, bears a remarkable comparison with the Union canal—as 75 miles is to 90 locks, so is 89 miles to 107 locks. This summit pound can be fed from the Chatauque lake, which was styled by Mr. Gallatin "an extensive and important elevated reservoir."*

The Oil creek and Black creek summit has some peculiar features. At the mills of Cady and Baldwin, on Oil creek, which is the highest point from which arks and rafts have been sent, the high floods flow over the intermediate ground, (a marsh,) and pass to the gulf of St. Lawrence instead of the gulf of Mexico. Permanent streams of each pass in the marsh within twenty chains of each other.

The Oil creek descends with a moderate current to the Ishua, in which distance are three saw mills that would lose all their water by a canal.

Lime, which abounds at Batavia and a small distance south, has been found lately south of Perry village, but a little west of the Genesee river, on a very high level. The earthy lime is found in many places near the proposed canal line, particularly at Lime lake, which is proposed to be brought into the Ishua, to feed the upper level of this canal.

A summit pound here would be abundantly supplied with water. The drainage of 190 miles of surface can be turned into it. See map No. 10, where this tract is marked out by a red dotted line. Mr. Roberts gives the following account of the capacity of the streams in October last.

Ishua creek at Farewell's mills—cubic feet per minute,	750
Lime lake, Beaver lake, and Peacock lake, which can be brought through feeders into the Ishua, (see map No. 5,)	400
Oil creek,†	450
Together per minute,	1600

The four feeders shown on map No. 5 are, together, 11 miles long, which may be valued as so much canal.

Estimates then will be on

111 miles canal, at $5000 per mile,	$555,000
1059 feet of lockage, at $150 per foot rise,	158,850
Extras for passing Genesee falls,	30,000
Deep cutting on the summit two miles long, deepest eight feet,	12,320
Deep cutting on Lime lake feeder, one mile ten feet,	10,560
To secure against slips on Genesee river,	30,000
Aqueduct over Canaskraga,	10,000
Dams at Conesus and Honeyoe outlets,	2,000
Dam on Genesee river at the mouth of Black creek,	2,000
Amounting to	$810,730
For superintendence and engineers, add 8 per cent,	64 858
Total amount,	$875,588

* Gallatin's report, &c.

† Mr. Roberts made Oil creek at its mouth 551 feet; about 100 feet perhaps cannot come into the summit pound.

[*To be continued.*]

GREAT RAILROAD MEETING.—At a meeting of citizens of the counties of Ontario, Livingston and Genesee, held at Haxton's Hotel, in the village of Caledonia, on Wednesday the 15th day of January, 1834, for the purpose of taking into consideration the propriety of making application to the legislature of this state, now in session, for an act of incorporation to authorize the construction of a *Railroad from Buffalo, through Batavia, Le Roy, Caledonia, Avon and Canandaigua to Geneva*, the Hon. MOSES ATWATER, of Canandaigua, was called to the chair, and GEO. W. CLINTON, of Canandaigua, and LANSING B. MIZNER, of Geneva, were appointed Secretaries.

The object of the meeting having been briefly stated by H. J. Redfield, Esq. it was, on motion.

Resolved, That a Committee of five be appointed to prepare resolutions for the consideration of the meeting. Whereupon David Hudson, of Geneva, Heman J. Redfield and Jacob Le Roy, of Le Roy, George Hosmer, of Avon, and William Blossom, of Canandaigua. were appointed said Committee.

The Committee having retired for a short time, returned, and after a few brief and pertinent remarks from their chairman, presented the following preamble and resolutions, which were fully considered and unanimously adopted.

Whereas, in the construction of the Erie canal, insurmountable obstacles were presented to locating that invaluable improvement along the great thoroughfare between Geneva and Buffalo, whereby a very large and most valuable portion of western New-York has been, in a great measure, deprived of the immediate advantages resulting from the completion of that work;

And whereas those natural obstacles which are presented to the formation of canals, are not met with in the construction of Railroads, and it being manifest from the examinations and surveys already made, that a Railroad may be laid down from Buffalo, on a line passing through Batavia, Le Roy, Caledonia, Avon and Canandaigua, to Geneva, at an expense within the means of those who are interested in the proposed measure;

And whereas the construction of the said road, on the line aforesaid, will very greatly advance the agricultural and manufacturing interests of this part of the state; therefore,

Resolved, That it is expedient to take measures immediately for applying to the legislature, now in session, for an act incorporating a company to construct a Railroad from Buffalo, through Batavia, Le Roy, Caledonia, Avon and Canandaigua, to Geneva, as nearly on the great western thoroughfare as may be practicable.

Resolved, That a Committee of three be appointed to take the necessary steps for carrying into effect the foregoing resolutions.

Whereupon, Heman J. Redfield, of Le Roy, Jared Wilson, of Canandaigua, and George Hosmer, of Avon, were appointed said Committee.

Upon motion, it was also

Resolved, That Henry Morris, of Buffalo, Ethan B. Allen, of Batavia, Heman J. Redfield, of Le Roy, Robert McKay, of Caledonia, Curtis Hawley, of Avon, M. W. Brown, of Lima, G. W. Clinton, of Canandaigua, and L. B. Mizner, of Geneva, be appointed a Committee of Correspondence.

Resolved, That the proceedings of this meeting be published in the newspapers at Buffalo, Batavia, Le Roy, Canandaigua and Geneva, and in the Albany Argus.

MOSES ATWATER, Chairman.
GEO. W. CLINTON, } Secretaries.
L. B. MIZNER, }

RAILROAD FROM LONDON TO PARIS.—In the *Journal des Debats*, of Wednesday, we find a very able article, written by a native of France, resident in London, upon the important advantages likely to result from the formation of a railroad between London and Paris. In the estimate of the effects likely to arise from facilitating the communication between the two countries, the writer chiefly takes into consideration those that will be produced in France; and among the benefits which his country will derive from the speedy and cheap conveyance afforded by railroads, he places particular stress upon the *commercial education* which it will be the means of bestowing upon his countrymen. "If," he observes, "there were a railroad from London to Paris, we Frenchmen, who scarcely know what business is, would go to learn it in London, where the spirit of business seems to be born with the people. Our speculators would there see how great undertakings are conducted simply and without diplomacy. Our retail venders and purchasers would learn from the English, that to buy and sell well it is not necessary to charge exorbitantly and to haggle for lower prices. Our capitalists and merchants would find that there is no durable commercial prosperity and no security for capital where credit is not well founded; they would see the operations of the Bank of England and its branches, and perhaps they might be disposed to introduce into their own country similar institutions, which are so advantageous both to the public and to the proprietors. We should see there in what *comfort* consists, so essential to the tranquillity of life, and how it may be attained. As we are a people abounding in self-love, we should return from England ashamed of the condition of our agriculture, of our modes of communication, of our schools of elementary instruction, and we should endeavor to equal our neighbors in these respects. The railway from London to Paris would thus become an institution for public education. It would constitute a commercial establishment of the first order, and it would also become a political institution, and form the elements of a close and indissoluble alliance between France and England."—[London Courier.]

RAILWAYS.—We are glad to find that the directors of the Liverpool and Birmingham railway are proceeding in the formation of their works with a degree of promptitude and activity which augurs well for their speedy completion. In the adjoining county of Chester, the cutting of the line has commenced at several points; and in that part of the line which lies between Knutsford and Mere, considerable progress has already been made; and we perceive that the directors are advertising for tenders for the erection of a viaduct over the river Weaver, in the township of Dutton, which, when completed, will be, perhaps, the most magnificent structure of the kind in the United Kingdom. It is to consist of 18 arches, each of 60 feet span, and 60 feet high; so that the Sankey viaduct will appear insignificant in comparison with it.—[Manchester Guardian.]

Application is to be made in the ensuing session of Parliament, for powers to extend the line of the Grand Junction Railway, and by means of a tunnel to connect it with the London and Birmingham Railway, at the termination of the line of the latter railroad in Nova Scotia Gardens.

NOVEL SPECIES OF STREET PAVEMENT.—A gentleman lately from St. Petersburgh describes a new and ingenious mode of paving streets, successfully tried in that capital. Instead of wrought stones or Macadam's gravel (both of which are in use there) the Russians have employed blocks of wood, we presume hard wood, set on end. They are about a foot long, by eight or nine inches broad, and are cut into hexagons, which are closely joined and fitted to each other. When seen from a window in the second or third story, they present a regular and beautifully tesselated surface, like the inlaid oak floors seen in old houses. The droskies, which, from their heaviness and the smallness of their wheels, make an intolerable noise on the wrought stone pavement, pass over the blocks of wood as quietly as if they rolled on a carpet.—[Liverpool Albion.]

A correspondent of the United States Gazette says that an arrangement has been made by our enterprizing follow-citizen, Colonel Reeside, with the Camden and Amboy Rail Road Company, for the conveyance of three mails. daily, between this city and New York. This arrangement, for which Colonel Reeside is entitled to the thanks of the public, is to go into operation in a few days.

MILL-WORK.—Under this head we purpose noticing the simplest combinations of wheel-work which are employed in the construction of mills, and, under the articles WIND and WATER MILLS, complete views, both graphic and descriptive, will be given of their construction.

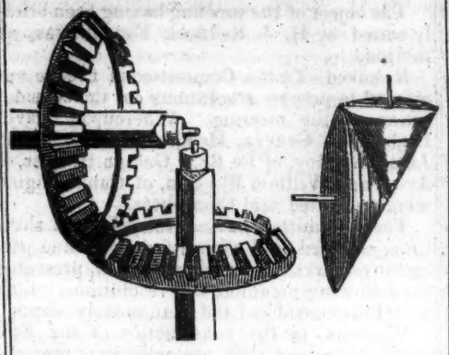
The business of a millwright is usually combined with the practical part of engineering, and much of the wind and water power formerly employed in giving motion to machinery is now superseded by the introduction of the steam engine. Indeed, without the agency of steam power, this country could in no shape compete with other manufacturing nations; so that, on account of the great importance of the steam engine as a prime mover, it will be advisable to devote a commensurate space to its illustration.

Various are the methods by which motion may be communicated from one part of a machine to another; and much of the skill of the millwright consists in his adapting certain methods to his particular purposes. Sometimes a simple cord, or a cord with pulleys, may be used. Levers, either simple or combined, are employed to communicate and also change the direction of the motion. Rods also are employed, which may be carried to a great distance by being connected together. But of all the modes of communicating motion, that by means of wheels is the most frequent. Wheels may be made to turn each other even by the simple contact of their surfaces when pressed together; or their circumferences may be formed into brushes with short thick hair, which enable them to turn each other with considerable force; or they may have cords, or straps of leather, or chains, passing from one to another; and at other times there are points or protuberances on the rims of the wheels. The most usual method, however, of making wheels drive each other, is by means of teeth. These are either cut into the substance of which the wheel is composed, when it is of metal; or formed at the same time as the rest of the wheel, when it is cast.

The proper method of shaping the teeth of wheels, so as to communicate the motion equally, and with as little friction as possible, is a matter of very great nicety, and has given rise to much study among mechanics. The ends of the teeth should be curves, but not parts of complete circles. They may be formed of the curve called the epicycloid, or of the involutes of circles, which are curves described by a point of a thread, which has been wound round the wheel while it is uncoiled.

A wheel which has teeth cut upon the circumferences, so as to project out in the plane of its face, is called a spur wheel; and, when the projection of the teeth is at right angles to the face of the wheel, and parallel to the axis, the wheel is called a crown or contrate wheel. Sometimes the faces of the two wheels are in the same plane, and consequently the axes parallel; and at other times the axes are at right angles to each other, one being a spur and the other a contrate wheel.

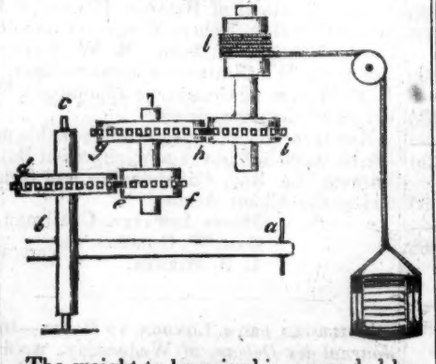
There is a mode of placing the teeth frequently resorted to, which consists in levelling the edge of the wheel, and cutting the teeth on the bevel, by which they may turn in each other, though variously inclined, and the teeth have also great strength. The principle consists in the cones rolling on the surface of each other, as in the annexed right-hand engraving; if their bases are equal, they will perform their revolutions in one and the same time.



If the cones are fluted, or have teeth cut in them diverging from the centre, they are then called *bevel geer*. The teeth may be made of any dimension, according to the strength required; and it is of great use to communicate a motion in any direction, or to any part of a building. The bevel geer represented in the left-hand figure must be supported by a frame at the point where the pivots intersect each other. The frame is usually formed of iron or wood, and when the latter is employed the pivot-hole is of brass. The perpendicular shaft should always be made to revolve on a sharp point in the centre.

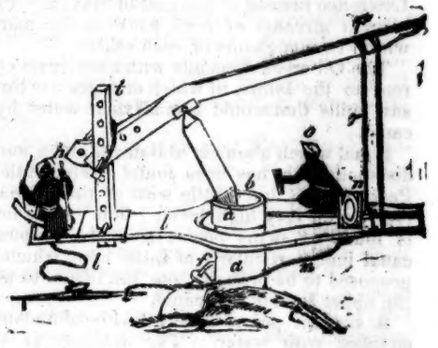
Hook's universal joint, (described at page 154, vol. ii,) may be applied to communicate motion instead of bevel geer, where the speed is to be continued the same, and where the angle does not exceed thirty or forty degrees and the equality of motion is not regarded; for, as it recedes from a right line, its motion becomes very irregular. This joint may be constructed by a cross, or with four pins fastened at right angles upon the circumference of a hoop, or solid ball. It is of great use in cotton mills, where the tumbling shafts are continued to a distance from the moving power.

The employment of animal power in the simplest species of mill-work may be well illustrated by the accompanying sketch, in which a horse may be attached to a long lever, and thus made to raise a weight by a train of wheels and pinions.



The weight to be raised is suspended by a rope or chain which winds round the drum, *l*. On the same axis is placed a wheel, *i*, actuated by another wheel, *g h*. The wheel, *d e*, gives motion to the whole, by the intervention of the small wheel at *f*. A horse at *a* may be considered as the prime mover, as the lever *a b* is on the axis *c*. Now, in this apparatus, there is a loss of power, but a gain in velocity.

The various modes of constructing mills for domestic, as well as manufacturing processes, will be explained hereafter, and we now purpose confining ourselves to a single example of the mode of employing animal power, in a way which, from its simplicity, might be adopted to a great extent in this country. There is a mill of a cheap and effective kind used in many parts of the East, which appears to have suggested the use of the ordinary snuff-mill. Indeed, it is, in some respects, superior to it. This mill, which is employed in the preparation of sugar, consists of a mortar, beam, lever, pestle, and regulator, as represented in the engraving beneath:



The mortar, *a a*, is a tree about ten feet long and fourteen inches over, which is sunk in the earth, so as to leave about two feet above ground. At the top is formed a conical cavity like a funnel, which ends in a hollow cylinder, with a hemispherical projection at the bottom, in order to allow the juice to run freely to the small opening that conveys it to a spout, *f*, from which it runs into an earthen pot. Round the upper mouth of the mortar is a circular cavity, *b*, which serves to collect any of the juice that may run over from the upper end of the pieces of cane. A channel is cut to convey this juice down the outside of the mortar to the spout, *f*.

The beam, *i*, is about 16 feet long and 6 inches thick, and is cut from any large tree that is divided by a fork into two arms. A hollow circle is made in the fork for the mortar, round which the beam turns horizontally: the surface of this excavation is secured by a semi-circle of some strong wood; the other end of the fork is left quite open, in order that the beam may be changed without any trouble. The bullock driver sits on the undivided end, to which the cattle are yoked by a rope, *l*, from his end of the beam, and they are kept in the circular tread by another rope, *m*, which passes from the yoke to the forked end of the beam. A basket, *n*, is placed upon the forks to hold the cuttings of the cane, and the man, *o*, who feeds the mill, sits between this basket and the mortar. He takes care to place the pieces of cane sloping down the cavity of the mortar, just at the time that the pestle comes round; and after the pestle has passed, he removes those which have been squeezed.

The lever, *p*, is a piece of timber nearly as long as the beam. The thickest end, which is also the lowest, is connected with the undivided end of the beam by means of a regulator, *t*. A little way from the place where it is joined to the regulator, a piece of very hard wood is morticed into the lower side of the lever, and a smooth conical hollow is made in this piece, to receive the head of the pestle. The end of the lever

furthest from the regulator is fastened by two ropes to the two arms of the beam.

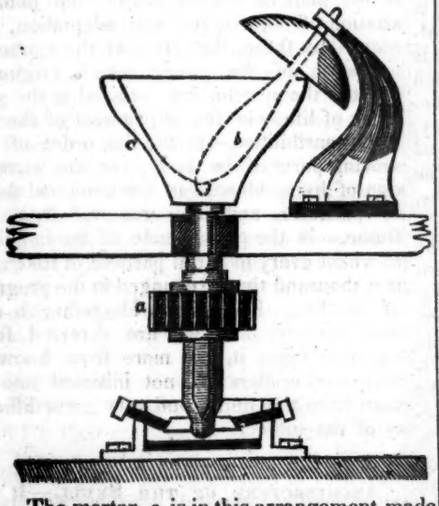
The pestle is a strong cylindrical piece of timber, cut to a point at each end. The upper end is a smooth cone, the lower end a pyramid of 12 to 15 sides, at the point of which is a strong cylinder. As the pestle is placed obliquely, it rubs strongly against the sides of the mortar as it passes round; and its cylindrical point rubs also on the top of the hemispherical projection, *d*, which is in the bottom of the cavity of the mortar.

The regulator, *t*, is a strong square of timber, which passes through the undivided end of the beam, and is secured below it by part of its circumference being left for cheeks. It is pierced by eight holes, and a pin is placed in the lowest hole, to prevent the regulator from falling when the strain is removed.

The canes with which the mill is supplied are cut into pieces six inches long. The mill goes night and day during crop time, and presses about fifty-six pots, or 218 gallons of juice, in that time. Two bullocks are used at a time, and as they are driven very fast, they are changed every time three pots of juice are expressed, and work no more that day.

In the manufacture of snuff in this country, the grinding is performed by a loaded pestle, made to turn round as it rubs against the sides of a cast iron mortar, the pointed lower end of the pestle being retained in its place by a hole at the bottom of the mortar. In large manufactories, a number of these mortars are placed in a circle, having a large toothed wheel in the centre, surrounded by as many upright spindles, with pinions to work in the wheel.

Mr. Gill has proposed an improvement on this plan, which is represented beneath:



The mortar, *c*, is in this arrangement made to revolve, and the pestle, *b*, is supported by a bracket firmly attached to the beam beneath. The pinion, *a*, rests on a conical axis, and communicates, as in the old arrangement, with the principal driving wheel.

Water-mills are of three kinds: *Breast-mills*, *undershot-mills*, and *overshot-mills*, according to the manner in which the water is applied to the great wheel. In the first, the water falls down upon the wheel at right angles to the *float-boards*, or bucket, placed to receive it. In the second, which is used where there is no fall of water, the stream strikes the float-boards at the lower part of the wheel. In the third, the water is poured over the top, and is received in buckets arranged round the wheel.

A less quantity of water will turn an overshot mill (in which the wheel has buckets instead of float-boards) than a breast-mill, where the fall of water seldom exceeds half the height of the wheel; so that, when there is but a small quantity of water, and a fall great enough for the wheel to lie under it, the bucket, or overshot-wheel, is always used; but, where there is a large body of water, with a small fall, the breast or float-board must be used. Where the water runs only upon a small declivity, it can act but slowly upon the under part of the wheel, in which case the motion of the wheel will be slow; and therefore the floats ought to be very long, that a large surface of water may act upon them, so that what is wanting in velocity may be made up in power; and then the cog-wheel may have a greater number of cogs in proportion to the rounds in the trundle, in order to give the mill-stone a sufficient degree of velocity.

It was the opinion of Smeaton, that the powers necessary to produce the same effect on an undershot-wheel, a breast-wheel, and an overshot-wheel, must be to each other as the numbers 2·4, 1·75, and 1.

Wind, which we may consider as the next substitute for animal power, appears to have been first employed to give motion to machinery in the beginning of the 6th century. The use of this species of mechanical force is, however, principally limited to the grinding of corn, the pressing of seed, and other simple manipulations, the great irregularity of this element precluding its application to those processes which require a continued motion.

A windmill with four sails, measuring seventy feet from the extremity of one sail to that of the opposite one, each being six feet and a half in width, is capable of raising 926 lbs. 232 feet in a minute, and of working on an average eight hours per day. This is equivalent to the work of 34 men, 25 square feet of canvass performing the average work of a day laborer. A mill of this magnitude seldom requires the attention of more than two men; and it will thus be seen that, making allowance for its irregularity, wind possesses a decided superiority over every species of animal labor.

The following very important errors have frequently been made by mathematicians and practical mechanics, in the estimation of the force of the wind or the water on oblique surfaces; they have generally arisen from inattention to the distinction between pressure and mechanical power. It may be remonstrated that the greatest possible pressure of the wind or water, on a given oblique surface at rest, tending to turn it in a direction perpendicular to that of the wind, is obtained when the surface forms an angle of about 55° with the wind; but that the mechanical power of such a pressure, which is to be estimated from a combination of its intensity with the velocity of the surface, may be increased without limit by increasing the angle of inclination, and consequently the velocity. The utmost effect that could be thus obtained would be equal to that of the same wind or stream acting on the float-boards of an undershot-wheel; but, since in all practical cases the velocity is limited, the effect will be somewhat smaller than this: for example, if the mere velocity of the sails or float-boards be supposed equal to that of the wind, the mechanical power will be more than four-fifths as great as that of an undershot wheel; that is, in the case of a windmill, more than four-fifths of the utmost effect that can be obtained from the wind. In such a case Maclaurin has shown that the sails ought to make an angle of 74° with the direction of the wind: but in practice it is found most advantageous to make the angle somewhat greater than this, the velocity of the extremities of the sails being usually, according to Mr. Smeaton, more than twice as great as that of the wind. It appears, therefore, that the oblique sails of the common windmill are in their nature almost as well calculated to make the best use of any hydraulic force as an undershot-wheel; and, since they act without intermission throughout their whole revolution, they have a decided advantage over such machines as require the sails or fans to be exposed to a more limited stream of the wind during one half only of their motion, which is necessary in the horizontal windmill, where a screen is employed for covering them while they are moving in a direction contrary to that of the wind: and such machines, according to Smeaton, are found to perform little more than one-tenth of the work of those which are more usually employed. The sails of a common windmill are frequently made to change their situation, according to the direction of the wind, by means of a small wheel with sails of the same kind, which turns round whenever the wind strikes on either side of it, and drives a pinion turning the whole machinery; the sails are sometimes made to furl or unfurl themselves, according to the velocity of the wind, by means of a revolving pendulum, which rises to a greater or less height, in order to prevent the injury which the flour would suffer from too great a rapidity in the motion, or any other accidents which might happen in a mill of a different nature. The inclination of the axis of a windmill to the horizon is principally intended to allow room for the action of the wind at the lower part, where it would be weakened if the sails came too nearly in contact with the building, as they must do if they were perfectly upright. When it is necessary to stop the motion of a windmill, a break is applied to the surface of a large wheel, so that its friction operates with a considerable mechanical advantage.—[Partington's Scientific Gazette.]

Singularity of Records.—There is, perhaps, no one principle in human nature that leads to greater consequences, than the concentration of application to singular research.

But this, like every other principle, has occasionally strange and useless terminations, that may be called *lusus naturæ* in mortals. As an instance of this, I will present yon with the result of a man's labor for three years, eight or nine hours in a day, Sundays not excepted, to determine the verses, words, and letters, contained in the Bible.

Verses - - - -	31,173
Words - - - -	773,692
Letters - - - -	3,566,480

The middle and the least chapter is the 117th Psalm.

The middle verse is the 8th verse of the 171st Psalm.

Jehovah is named 6,855 times. The middle of these Jehovahs is in second Chronicles, fourth chapter and 16th verse.

The word *and* is found in the Bible 46,227 times.

The least verse in the Old Testament, is in first Chronicles, 1st and 10th verses. The least in the New Testament, 11th chapter of John, 35th verse.—[London paper.]

Animal Mechanics, or Proofs of Design in the Animal Frame. [From the Library of Useful Knowledge.]

INTRODUCTION.

To prepare us for perceiving design in the various internal structures of an animal body, we must first of all know that perfect security against accidents is not consistent with the scheme of nature. A liability to pain and injury only proves how entirely the human body is formed with reference to the mind; since, without the continued call to exertion, which danger and the uncertainty of life infer, the developement of our faculties would be imperfect, and the mind would remain, as it were, uneducated.

The contrivances (as we should say of things of art,) for protecting the vital organs, are not absolute securities against accidents; but they afford protection in that exact measure or degree calculated to resist the shocks and pressure to which we are exposed in the common circumstances of life. A man can walk, run, leap, and swim, because the texture of his frame, the strength and power of his limbs, and the specific gravity of his body, are in relation with all around him. But were the atmosphere lighter, the earth larger, or its attraction more—were he, in short, an inhabitant of another planet,—there would be no correspondence between the strength, gravity, and muscular power of his body, and the elements around him, and the balance in the chances of life would be destroyed.

Without such considerations the reader would fall into the mistake that weakness and liability to fracture imply imperfection in the frame of the body, whereas a deeper contemplation of the subject will convince him of the incomparable perfection both of the plan and of the execution. The body is intended to be subject to derangement and accident, and to become in the course of life more and more fragile, until, by some failure in the frame-work or vital actions, life terminates.

And this leads us to reflect on the best means of informing ourselves of the intention or design shown in this fabric. Can there be any better mode of raising our admiration than by comparing it with things of human invention? It must be allowed, that we shall not find a perfect analogy. If we compare it with the forms of architecture —the house or the bridge are not built for motion, but for solidity and firmness, on the principle of gravitation. The ship rests in equilibrium prepared for passive motion, and the contrivances of the ship-builders are for resisting an external force: whilst in the animal body we perceive securities against the gravitation of the parts, provisions to withstand shocks and injuries from without, at the same time that the frame-work is also calculated to sustain an internal impulse from the muscular force which moves the bones as levers, or, like a hydraulic engine, propels the fluids through the body.

As in things artificially contrived, lightness and motion are balanced against solidity and weight, it is the same in the animal body.

A house is built on a foundation immoveable, and the slightest shift of the ground, followed by the ruin of the house, brings no discredit on the builder; for he proceeds on the certainty of strength from gravitation on a fixed foundation. But a ship is built with reference to motion, to receive an impulse from the wind, and to move through the water. In comparison with the fabric founded on the fixed and solid ground, it becomes subjected to new influences, and in proportion as it is fitted to move rapidly in a light breeze, it is exposed to founder in the storm. A log of wood, or a Dutch dogger, almost as solid as a log, is comparatively safe in the trough of the sea during a storm—when a bark, slightly built and fitted for lighter breezes, would be shaken to pieces: that is to say, the masts and rigging of a ship (the provisions for its motion) may become the source of weakness, and, perhaps, of destruction; and safety is thus voluntarily sacrificed in part, to obtain another property of motion.

So in the animal body: sometimes we see the safety of parts provided for by strength calculated for inert resistance; but when made for motion, when light and easily influenced, they become proportionally weak and exposed, unless some other principle be admitted, and a different kind of security substituted for that of weight and solidity: still a certain insecurity arises from this delicacy of structure.

We shall afterwards have occasion to show that there is always a balance between the power of exertion and the capability of resistance in the living body. A horse or a deer receives a shock in alighting from a leap; but still the inert power of resisting that shock bears a relation to the muscular power with which they spring. And so it is in a man: the elasticity of his limbs is always accommodated to his activity; but it is obvious, that in a fall, the shock, which the lower extremities are calculated to resist, may come on the upper extremity, which, from being adapted for extensive and rapid motion, is incapable of sustaining the impulse, and the bones are broken or displaced.

The analogy between the structure of the human body and the works of human contrivance, which we have to bring in illustration of the designs of nature, is, therefore, not perfect; since sometimes the material is different, sometimes the end to be attained is not precisely the same; and, above all, in the animal body a double object is often secured by the structure or frame-work, which cannot be accomplished by mere human ingenuity, and of which, therefore, we can offer no illustration strictly correct.

However ingenious our contrivances may be, they are not only limited, but they present a sameness which becomes tiresome. Nature, on the contrary, gives us the same objects of interest, or images of beauty, with such variety, that they lose nothing of their influence and their attraction by repetition.

If the reader has an imperfect notion of design and providence, from a too careless survey of external nature, and the consequent languor of his reflections, we hope that the mere novelty of the instances we are about to place before him may carry conviction to his mind; for we are to draw from nature still, but in a field which has been left strangely neglected, though the nearest to us of all, and of all the most fruitful.

Men proceed in a slow course of advancement in architectural, or mechanical, or optical sciences; and when an improvement is made, it is found that there are all along examples of it in the animal body, which ought to have been marked before, and which might have suggested to us the improvement. It is surprizing that this view of the subject has seldom, if ever, been taken seriously, and never pursued. Is the human body formed by an all-perfect Architect, or is it not? And, if the question be answered in the affirmative, does it not approach to something like infatuation, that possessing such perfect models as we have in the anatomy of the body, we yet have been so prone to neglect them?

We undertake to prove that the foundation of the Eddystone lighthouse, the perfection of human architecture and ingenuity, is not formed on principles so correct as those which have directed the arrangement of the bones of the foot; that the most perfect pillar or kingpost is not adjusted with the accuracy of the hollow bones which support our weight; that the insertion of a ship's mast into the hull is a clumsy contrivance, compared with the connections of the human spine and pelvis; and that the tendons are composed in a manner superior to the last patent cables of Huddart, or the yet more recently improved chain-cables of Bloxam.

Let us assume that the head is the noblest part; and let us examine the carpentry and architectural contrivances exhibited there.

But before we give ourselves up to the interest of this subject, it will gratify us to express our conviction, that the perfection of the plan of animal bodies, the demonstration of contrivance and adaptation, but more than these, the proof of the continual operation of the power which originally created the system, are evinced in the property of life,—in the adjustment of the various sensibilities,—in the fine order of the moving parts of the body,—in the circulation of living blood,—in the continual death of particles, and their removal from the frame,—in the permanence of the individual whilst every material particle of his frame is a thousand times* changed in the progress of his life. But this is altogether a distinct inquiry, and we are deterred from touching upon it, not more from knowing that our readers are not initiated into it, than from the depth and very great difficulty of the subject.

CHAPTER I.

ARCHITECTURE OF THE SKULL.—It requires no disquisition to prove that the brain is the most essential organ of the animal system, and being so, we may presume that it must be especially protected. We are now to inquire how this main object is attained?

We must first understand that the brain may be hurt, not only by sharp bodies touching and entering it, but by a blow upon the head, which shall vibrate through it, without the instrument piercing the skull. Indeed, a blow upon a man's head, by a body which shall cause a vibration through the substance of the brain, may more effectually deprive

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* The old philosophers gave out that the human body was seven times changed during the natural life. Modern discoveries have shown that the hardest material of the frame is changing continually; that is, every instant of time from birth to death.

him of sense and motion, than if an axe or a sword penetrated into the substance of the brain itself.

Supposing that a man's ingenuity were to be exercised in contriving a protection to the brain, he must perceive that if the case were soft, it would be too easily pierced; that if it were of a glassy nature, it would be chipped and cracked; that if it were of a substance like metal, it would ring and vibrate, and communicate the concussion to the brain.

Further thoughts might suggest, that whilst the case should be made firm, to resist a sharp point, the vibrations of that circular case might be prevented by lining it with a softer material; no bell would vibrate with such an incumbrance—the sound would be stopped like the ringing of a glass by the touch of a finger.

If a soldier's head be covered with a steel cap, the blow of a sword which does not penetrate will yet bring him to the ground by the percussion which extends to the brain; therefore, the helmet is lined with leather, and covered with hair, for, although the hair is made an ornament, it is an essential part of the protection: we may see it in the head-piece of the Roman soldier, where all useless ornament, being despised as frivolous, was avoided as cumbrous.

We now perceive why the skull consists of two plates of bone, one external, which is fibrous and tough, and one internal, dense to such a degree that the anatomist calls it *tabula vitrea* (the glassy table).

Nobody can suppose this to be accidental. It has just been stated that the brain may be injured in two ways: a stone or a hammer may break the skull, and the depressed part of the bone injure the brain; whilst, on the other hand, a mallet struck upon the head will, without penetrating, effectually deprive the brain of its functions, by causing a vibration which runs round the skull, and extends to every portion of its contents.

Were the skull, in its perfect or mature state, softer than it is, it would be like the skull of a child; were it harder than we find it is, it would be like that of an old man. In other words, as in the former it would be too easily pierced, so in the latter it would vibrate too sharply and produce concussion. The skull of an infant is a single layer of elastic bone; on the approach to manhood it separates into two tables; and in old age it again becomes consolidated. During the active years of man's life the skull is perfect: it then consists of two layers, united by a softer substance; the inner layer is brittle as glass, and calculated to resist any thing penetrating; the outer table is tough, to give consistence, and to stifle the vibration which would take place if the whole texture were uniform and like the inner table.

The alteration in the substance of the bones, and more particularly in the skull, is marvellously ordered to follow the changes in the mind of the creature, from the heedlessness of childhood to the caution of age, and even the helplessness of superannuation.

The skull is soft and yielding at birth; during childhood it is elastic, and little liable to injury from concussion; and during youth, and up to the period of maturity, the parts which come in contact with the ground are thicker, whilst the shock is dispersed towards the sutures (the seams or joinings of the pieces,) which are still loose. But when, with advancing years, something tells us to give up feats of activity, and falls are less frequent, the bones lose that nature which would render concussion harmless, and at length the timidity of age teaches man that his structure is no longer adapted to active life.

We must understand the necessity of the double layer of the skull, in order to comprehend another very curious contrivance. The sutures are the lines of union of the several bones which form the *cranium**, and surround and protect the brain. These lines of union are called *sutures*, (from the Latin word for *sewing*,) because they resemble seams. If a workman were to inspect the joining of two of the bones of the cranium, he would admire the minute dovetailing by which one portion of the bone is inserted into, and surrounded by, the other, whilst that other pushes its processes or juttings out between those of the first in the same manner, and the fibres of the two bones are thus interlaced, as you might interlace your fingers. But when you look to the internal surface, you see nothing of this kind; the bones are here laid simply in contact, and this line by anatomists is called *harmonia*, or harmony. Architects use the same term to imply the joining by masonry. Whilst the anatomists are thus curious in names, it is provoking to find them negligent of things more interesting. Having overlooked the reason of the difference in the tables of bones, they are consequently blind to the purpose of this difference of the outward and inward part of a suture.

Suppose a carpenter employed upon his own material, he would join a box with minute and regular indentations by dovetailing, because he knows that the material on which he works, from its softness and toughness, admits of such adjustment of its edges. The processes of the bone shoot into the opposite cavity with an exact resemblance to the foxtail wedge of the carpenter—a kind of tenon and mortice when the pieces are small.

But if a workman in glass or marble were to inclose some precious thing, he would smooth the surfaces and unite them by cement, because, even if he could succeed in indenting the line of union, he knows that his material would chip off on the slightest vibration. The edges of the marble cylinders which form a column are, for the same reason, not permitted to come in contact; thin plates of lead are interposed to prevent the edges, technically termed *arrises*, from chipping off or splitting.

Now apply this principle to the skull. The outer softer tough table, which is like wood, is indented and dove tailed; the inner glassy table has its edges simply laid in contact. It is mortifying to see a course of bad reasoning obscure this beautiful subject. They say that the bone growing from its centre, and diverging, shoots its fibres betwixt those which come in an opposite direction; thus making one of the most curious provisions of nature a thing of accident. Is it not enough to ask such reasoners, why there is not a suture on the inside as well as on the out?

* *Cranium*, from a Greek word, signifying a helmet. The cranium is the division of the skull appropriated to the protection of the brain; it consists of six bones—the *frontal* (or forehead); two *parietal* (walls or side bones); the *occipital* (back of the head); and two *temporal* (or temple) bones.

The junction of the bones of the head generally being thus exact, and like the most finished piece of cabinet work, let us next inquire, whether there be design or contrivance shown in the manner in which each bone is placed upon another.

Fig. 1.

A, the parietal bone; B, the frontal bone; C, the occipital bone; D, the temporal bone; E, the sphenoid bone.

When we look upon the side of the skull thus, the temporal suture betwixt the bones A and D is formed in a peculiar manner; the lower or temporal bone laps over the superior or parietal bone. This, too, has been misunderstood: that is to say, the plan of the building of the bones of the head has not been considered, and this joining, called the squamous* suture, which is a species of scarfing, has been supposed a mere consequence of the pressure of the muscle which moves the jaw.

Dr. Monro says, "the manner how I imagine this sort of suture is formed at these places, is that, by the action of the strong temporal muscles on one side, and by the pressure of the brain on the other, the bones are made so thin that they have not large enough surfaces opposed to each other to stop the extension of their fibres in length, and thus to cause the common serrated appearance of sutures; but the narrow edge of the one bone slides over the other."

The very name of the bones might suggest a better explanation. The *ossa parietalia*† are the two large bones in a regular square, serving as walls to the interior, or room of the head, where the brain is lodged. (See A, in the foregoing figure.)

* From *squama*, the Latin for a *scale*, the thin edges lying over each other like the scales of a fish.

† From the Latin word *paries*, a wall.

‡ In the second Treatise on Heat, the reader will find an account of the manner in which the expansion of iron by heat, and its subsequent contraction on cooling, is used in order to cog great buildings.

(To be continued.)

AGRICULTURE, &c.

[*From the New-York Farmer.*]

DRAINING.—In low lands, where furrows are substituted for under drainings, it is calculated that the loss of seed in the furrows, and the superiority of the crops, would, in *two years*, pay the expense of the draining.

SUGAR FROM BEETS.—A writer in Goodsell's Farmer, who has been engaged in constructing machinery for the manufacture of this sugar in Europe, proposes to commence business at Rochester. He makes the following calculation:

Cost of producing an acre,	$20 00	
Cost of manufacturing do.,	40 00	
		60 00
Amount of sugar produced,	151 20	
Value of pulp remaining,	6 00	
		157 20
Nett profit per acre,		$97 20

The Farmer's Magazine, conducted by the Editor of the Mark Lane Express. London.

[Continued from page 42.]

TURNIPS TO THE ACRE.—Loudon, in his late tour of Scotland, says, the cultivation of turnips in rows is carried to so high a degree of perfection in Scotland, that 30 tons of Swedish turnips are calculated on to the statute acre.

BEET ROOT SUGAR.—The decrees of Bonaparte brought a hundred thousand acres yearly under cultivation of beets for sugar. A great oversight of the French government was to compel every farmer to devote a portion of his land to this root, without fixing some obligation on the manufacturers to pay a remunerating price. The consequence was, that the farmers were wholly at the mercy of the manufacturers.

"To the manufacturer, we are told, the profit was ample; an equal quantity of sugar with that of the West Indies—which at that time sold for *five shillings* a pound, could be produced on the spot from mangel wurtzel at *less than one shilling* per pound! and to such perfection had the sugar thus made arrived, that the prefect, mayor, and some of the chief persons of Bruges, who were invited by a manufacturer to witness the result of his experiments, allowed the specimens which he produced to *exceed* those of the *foreign sugar!*

"The British people are really of opinion that Napoleon's novel project *entirely failed*, and that our continental friends are still indebted to their colonies for the immense supplies of sugar they annually consume. They will be surprized to know, that not only does the manufacturer continue to thrive, but that the produce is abundantly ample to satisfy all the wants of the people, *independently of any supplies from abroad*, and that the French Minister of Commerce has deemed the time to have arrived, when beet-root sugars shall be made subservient to the fiscal necessities of the State.

"In 1828, it seems, 58 establishments for the manufacture of sugar in France were known to be in activity, and 50 more in process of construction; and it was these ascertained facts that induced the Government to reflect 'whether the time had not come for making the domestic sugars bear a part of the burden before laid exclusively upon the exotic ones.'

"In the inquiry that was instituted in 1828, when it was attempted to remove the difficulties which attended the fixing a tariff on sugars, it was stated, that 'if the tariff is not changed, and no extraordinary event happens, *five years* will be enough to enable the beet-root establishments to produce enough *for the whole consumption of France!* and in *ten years to compete with the colonies on equal terms!* or rather the colonies will not be able to contend with them; for the killogramme of domestic sugar can then be afforded at 60 cents, *i. e.* the price which the sugar from the cane necessarily costs in the colony itself, and to which must be added freight, insurance, and commission.

"The manufacture of sugar from the beet-root is concentrated principally in the three departments of le Nord, la Somme, and le Pas-de-Calais, where the land is well fitted for the kind of culture which it requires. The *worst* produces 12,000 kil.* of beets per acre, (query *hectare*, 2 a. 1 r. 30 p.); the *best*, 60,000! There are some establishments in other departments, even in the South, but they are not in the way of increase, since the beets are in general in that part of France watery and barren of sugar.

"As an useful auxiliary to agriculture, this branch of manufacture is justly extolled for the excellent means which it offers for improving the soil; bringing it from the fallow, unproductive state; and (in the opinion of a distinguished French agriculturist) as being about to produce, in the national economy, one of those happy revolutions whose importance is not always felt at the time, but which posterity will note as the cause of the greatest commercial and agricultural prosperity."

* The killogramme is 2 lbs. 3 oz. 5 drachms and 38 grains over. It is usual in speaking of 100 killogrammes, to estimate them at 222 lbs.: or, in reference to approximate numbers, to consider the 100 killogrames as 2 cwt. English.

NEW-ZEALAND FLAX, *Phormium Tanex.*—This plant stands the winter of England. In 1828 only 60 tons, valued at 2,600 pounds sterling, were imported from Sydney into Great Britain. In 1830 there were 841 tons, and in 1831 1,062 tons. Its price in London is 15 to £25 per ton. The flax is prepared by the natives, and in strength and whiteness of fibre is superior to any analogous material.

FOOD FOR HORSES.—We often hear such and such food recommended, because it contains much nutritive property, chemically ascertained, without any regard to the bulk, or its adaptation to the digestive powers of the animal. One reason why oats are so much esteemed as food for horses is, that they have more bulk than most other grains. We make an extract from Mr. Dick's opinion.

"Under this view of the subject, it will be seen that a moderate proportion of nutritious food is only required, and that it is advisable to present it in as small a compass as will suit the nature of the digestive organs. But it would appear that a certain proportion of bulk is also necessary to the quantity of nutritious matter to keep up the proper action of the bowels. If the food is too rich and too much concentrated, it deranges the stomach and bowels, and produces disease; if too poor and bulky, it yields not the proper degree of support to the animal, while its bulk impedes respiration, and its weight detracts by its burdensomeness from the capability of the animal exerting himself. From these remarks, it will appear obvious that the grand desideratum is to give food containing as much nutriment, and in as small bulk, as is consistent with the economy of the animal."

CULTIVATION IN THE UNITED KINGDOM.—The following statement will be found interesting, as exhibiting the number of acres in cultivation in the United Kingdom, and the different purposes specified, for which they are employed in England and Wales, as well as the number of farms, and the annual amount of property derived from agriculture:

		Uncultivated Wastes.		
	Cultivated Acres.	Capable of Improvement.	Barren and unprofitable.	Total.
England,	25,632,000	3,454,000	3,256,400	32,342,400
Wales,	3,117,000	530,000	1,105,000	4,732,000
Scotland,	3,265,000	5,950,000	8,523,930	19,738,930
Ireland,	12,525,280	4,500,000	2,416,664	19,441,944
British Isles,	383,690	166,000	569,469	1,119,159
Total,	46,922,970	14,600,000	15,871,463	77,374,433

In England and Wales it is calculated that there are 3,250,000 acres employed in the cultivation of wheat; 1,250,0000 acres in that of barley and rye; 3,200,000 acres in that of oats, beans, peas; 1,200,000 acres in that of clover, rye grass, &c.; 1,200,000 acres in that of roots and cabbages, cultivated by the plough; 2,100,000 acres in that of fallows; 47,000 acres in that of hop grounds; 18,000 acres in that of pleasure grounds; 17,300,000 acres in that of depastured by cattle; 1,200,000 acres in that of hedge-rows, copses, and woods; 1,300,000 acres in that of ways and water courses, &c.; 5,029,000 acres in that of common and waste lands. Total of England and Wales, 37,094,000 acres.

SUBSTITUTION OF INANIMATE FOR ANIMATE POWER.—This is an important subject, and will, in all human probability, effect much change in the value of horses. The Journal of Elementary Locomotion estimates, on the calculation that £216,817,624 is the value of the agricultural produce of Great Britain, the saving of upwards of 120 millions yearly, by the substitution of inanimate for animate power.

It is calculated that out of the 1,800,000 horses in the United Kingdom, that the horses used *bona fide* for husbandry amount to 852,863. To these we will add 88,512, being the half of the number estimated as *not wholly* used for the same purpose.

The annual keep of ditto at £29 14s. per head, amounts to - - - -	£24,097,837 10 0
Duty upon ditto - - -	725,433 5 0
Interest upon these items, at £5 per cent. - - -	1,241,163 0 1¼
Add the 14th part of £10,818,296 13s. 4d. the capital sunk in the above horses, at the average of £13 6s. 8d. each, for average loss of life annually - - - - -	772,730 9 6¼
Farriery and other incidental expenses, £1 pr head	811,385 0 0
Total,	£27,648,539 4 8

We might add to this also the horses kept by small farmers, calculated to amount to 38,010, the annual approximating expenditure upon which would make the grand total equal to £03,000,000; which sum, at the least, would be saved to the growers by the cheaper mode of agriculture which the substitution of inanimate for animate power will effect.

This, perhaps, is greatly undervalued. Mr. Dupin, founder of the Mechanic Institute of France, in a comparative estimate of the amount of animate and inanimate force, applied to agriculture, in France and Great Britain, states the latter as follows:

Human race, 5,000,000, equivalent to 2,132,446 effective laborers.

Horses of full growth 1,250,000, equivalent to 8,750,000.

Whilst an authority of the highest consideration at home makes the brute labor employed in our husbandry to be ten times more than the human. In either case, allowing that a horse will do the work of six men, the suppression of brute force will, upon an approximating calculation, save nearly two-thirds of the annual expense of raising the food of the country.

The Farmer's Register. Edmund Ruffin, Editor and Proprietor. Richmond, 1833.

This is a monthly periodical of sixty-four closely printed large octavo pages, at five dollars per annum—principally devoted to southern agriculture, but more especially to that of Virginia.

The relative wealth and influence of the 'old dominion' have not been sustained, owing to the improvements in agriculture in the more Eastern States, to the virgin fertility of the Western, and to the internal improvements and prosperity of manufactures in all these States. Besides these causes of comparative decline, there has been an actual diminution of resources, arising principally from an exhausting system of cultivating the soil. We could scarcely believe that a section of our country so distinguished for intelligent and eminent men, could have pursued a course of cropping so wretched—founded on no higher philosophy than that it was the custom of forefathers. Field after field was cleared and kept under the plough without a single ameliorating crop, until from three to ten bushels of wheat were considered, on many estates, a crop equal to expectation. The exhausted condition of the soil compelled thousands to bid farewell to their native fields

and vales, and seek those in the far West that were under the culture of nature. Thus farm after farm was left to be overgrown with weeds, and to serve as monuments of a deficiency in agricultural science. In this state of general depression of landed property, Mr. Ruffin steps forth and calls the attention of Virginians to calcareous manures. This is succeeded by the publication of his Farmers' Register—the old dominion begins to awake—innumerable localities and inexhaustible quantities of marl are discovered east of the mountains—and now thousands are on the march of improvement. This ancient and renowned State is destined once more to rise in its strength and vigor. If Mr. R. continues to persevere and prosper, he will, in less than twenty years, be acknowledged as one of Virginia's greatest benefactors.

We shall proceed to make a few abridged notices and extracts, that will give our readers an idea of the work.

Clover and the Four-shift System.—The following may serve as one of the many excellent examples that the Register is bringing to the light of open day.

In the year 1816, Mr. James M. Selden took charge of Woods' farm, of 250 acres of arable land, the remaining 300 acres being all swamp land, subject to the inundation of the tides. Previous to his taking charge of the estate, it had been managed by overseers for a great number of years, under this disastrous system of three fields. To those who are acquainted with the character of the soil in the neck, it would be superfluous to say much. I shall therefore only state, that it possesses all the qualities of our best loam lands, only perhaps to a greater degree than any other within my knowledge: and probably would bear this harsh and bad treatment to a greater extent than most other soils. Under this three-field rotation, the crops on this estate were never more than 3 or 400 bushels of wheat, and from 100 to 120 barrels of corn. He at once saw that to persevere in this system of cultivation was to work for nothing, and finally to be left in utter poverty, so he resolved on a change to the four-field and fallow system. The crops, after the adoption of this change, were in every rotation increased to double, and in a very few years to five or six times the quantity.

The Weevil.—There is a long communication in the November number on this subject. The preventive found most successful was to thrash the wheat early, and to spread it where it may not heat so much as to hatch the insect.

Ornamental Trees.—Of this class, deciduous trees are preferable to evergreens—because they preserve our dwellings from the solar heat in summer, but admit it in winter, when it adds to our comfort. The variety caused by the change of the seasons in the foliage of trees, from the first budding to the fall of the brown and golden leaves of autumn, also serves to relieve the mind from the dull uniformity of the cone-bearing and resinous ever greens.

To save the Shoulders of Horses from being Chafed by the Collar.—Some of the gentlemen of South Carolina are in the habit of making long journeys by land in their own conveyances, and are obliged to resort to every method of affording relief to their horses. From one of these I derived the following simple expedient for preventing the shoulders of harness horses from being chafed by the collar. The shrewd practical sense of the gentleman referred to is a strong guarantee of the value of his suggestions. A short trial of my own has fully convinced me of the utility of what is *classically* denominated the sweater. This simple and effectual contrivance is made of two pieces of leather, which, for an ordinary horse, may be about 5½ inches wide at the top, 6 at the bottom, and 9 at the greatest protuberance, the front edge being straight, the posterior curved with a gradual swell adapted to the shape of the collar behind. These pieces must be sewed together at the bottom, and connected at top by two small straps and buckles, so as to be let out or taken up at will. The lower part must be so shaped as to fit the throat of the horse. A strap passes from the bottom of the sweater between the legs to the girth, by means of which it is kept in place. The strap should not be too tight, lest it might incline a balking horse to stop, when ascending a hill; and the buckle at the end near the girth, if it chafe, may be covered. The leather should be tolerably stout upper, rendered pliant by the occasional application of tallow to the outside. The inner side should be kept clean and smooth.

The sweater is in fact a sheath for the shoulders, and the collar rests on it instead of the skin of the animal. H.

Waynesborough, Va. Oct. 4th, 1833.

Preparation of Seed Wheat.—When I am about to commence seeding, I have two barrels prepared, one of which I have filled about two-thirds full with brine, strong enough to bear an egg, into which I have the seed poured very slowly, until the brine rises nearly to the top, which will be covered with the light grains of wheat, cheat and garlic, which are skimmed off with the hands, and the wheat at the bottom stirred once or twice to free it from any remaining impurities, which are again skimmed off. An old basket without a handle is then placed on the top of the empty barrel, through which the brine is poured from the wheat by two men taking the full barrel by its bottom on opposite sides. The wheat is then emptied into a large box, and the same process repeated from one barrel to the other alternately, until a sufficient quantity is washed for the day's seeding, and as much gypsum is then stirred into the whole mass as will adhere to the grain. Water is added occasionally, and a sufficiency of salt to maintain the strength of the brine, which is tested by an egg kept at hand for the purpose. The whole process is completed in the morning, by the time the teams are ready to proceed to their work. I suppose a bushel of salt would probably suffice for one hundred bushels of seed, which would, by reason of its invigorating qualities, be very well bestowed in that way, independently of its aid in freeing the wheat from its impurities.

F. H.

N. B. If the wheat is infected with smut, it will be effectually destroyed, by stirring in a portion of quick-lime before the gypsum.

Buckwheat.—In a translation of an article from Rozier's Cours Complet, we make the following extract:

Besides the common buckwheat of which we have spoken, there is a species considered preferable, which is known by the name of buckwheat of *Tartary*, or of *Siberia*, and which was in 1782 much extolled by M. Martin. This variety, which has been brought from Siberia by a missionary of Low Maine, is especially suitable to the north of France: it is more hardy than the common kind; it is less inclined to lodge, and produces more. The grain is smaller, the stalk more yellow, and more solid. According to M. Curant, who calls this grain *Martin-Corn*, (in honor of M. Martin, of whom we have spoken,) the Siberian buckwheat fears neither hot winds nor white frosts; it gives for one seed sown, nearly two thousand in rich soils—and elsewhere, from fifty to three hundred and more; it makes a better meal, and can be kept as well and as long as that from wheat. These incontestible advantages are accompanied by some inconveniences: in the first place, the Siberian buckwheat shatters in reaping still more easily than the common, and consequently demands an increase of precautions; then it grinds almost as slowly as rye, and it ought not to be sowed until July, a time when the hay harvest draws so heavily on the labor of the farmer.

Magnesian Marl.—Among the numerous beds of Marl, a correspondent of the Register gives an account of one which Mr. Ruffin found to contain 50 per cent. of carbonate of lime, and 31 of carbonate of magnesia. Magnesia in lime is considered by many as injurious to vegetation. Mr. R. has collected much, both *pro* and *con*. When used in moderate quantities, the testimony appears to be in its favor. On richer soils it will be used in greater quantities. Sir H. Davy explains this on the fact that magnesia has much less affinity for carbonic acid than lime has; and, consequently, as long as any caustic lime remains, the magnesia will not combine with carbonic acid, and thus remain, caustic, and poisonous or hurtful to plants. For a rich soil more carbonic acid gas is disengaged, and unites with it.

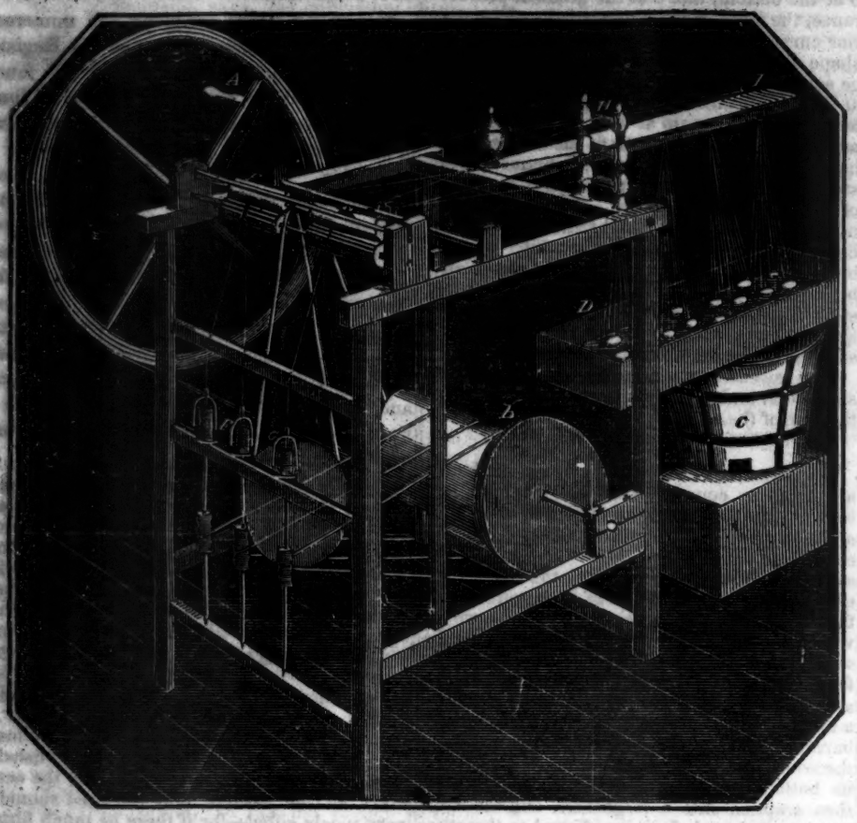
Easy Method of Sowing Grass Seeds.—I had a piece of sheet iron about four feet long and twenty inches wide, punched with small holes at distances of about half an inch or three quarters each way, and then made into a cylinder similar to a stove pipe. An axle passes through the cylinder, on each end of which is attached a wooden wheel of double the diameter of the cylinder, and on each end of the axle-tree are fixed the handles or frame, by which the machine can either be pulled after, or rolled before the seedsman, as he may prefer. A cylinder four feet long and six inches diameter will hold rather more than a half bushel of seed, and will sow about a bushel to the acre.* Here let me observe that the seed should be very nicely sifted—for if there be much filth or chaff left in the seed, they will not be sowed thick enough. The seed may be put into the cylinder either by taking off one wheel or by having a door cut in the cylinder, after the manner of the barrel churn.

Since using this grass sower, (if I may so call it,) I find the grass is sowed more regularly—that much time and labor is saved, and it is almost impossible for the wind to affect the seed at all, since they are nearly touching the ground by the time they are out of the box.

* The holes should be about the size of those commonly punched in tin for safes.

Salt a Manure for Cotton.—Alexander Jones, M. D., recommends, in the American Farmer, the use of salt as a manure to improve the staple of cotton. He says, if sea island cotton be planted for several years in succession in the interior of the country, it degenerates into the short staple cotton. In support of the benefit from salt, it is said that cotton in the vicinity of salt springs and licks is of a larger staple.

Indian Meal Bread.—Take as much corn meal as is wanting for use, sift it through a hair sifter, put it in an iron pot, and pour on it boiling water; stir it with a spatula or ladle till it becomes well mixed and quite thin; this being night, let it remain in the same vessel till morning, and if kept warm it will be well fermented, (which is necessary.) Then put it in what is called a Dutch oven, it being hot before the dough is put in it; apply good live coals on the lid of the oven and under it, being careful not to burn the bread. When thus prepared, if done carefully and according to this recipe, more wholesome and better bread cannot be used for breakfast. I think it an anti-dyspeptic, as no lard or butter is used in preparing the bread, though after it is cooked, good fresh butter adds to its flavor.—[American Farmer.]



Manufacture of Silk—Reeling, Twisting from the Cocoon—Description and Drawing of Brooks' Silk Machine. [From the New-York Farmer.]

The manufacture of silk is so likely to become an important branch of national industry, that we deem it important to lay before our readers all the information that we can obtain.

On the present occasion, we shall simply state the particulars of an experiment with Mr. Adam Brooks' machine.

REFERENCES.—A, the handle of the crank, giving motion to the machine. There is a band around the large wheel, passing around a small wheel attached to the axis of the cylinder or drum. B, the drum or cylinder, around which the bands giving motion to the spindles pass. C, the furnace for heating to blood heat the water in the pan D, containing the cocoons. E, the rollers regulating the supply of thread given to the spindles. F, the two spindles for twisting the single threads. G, the spindle for the double twisting or sewing silk. H, the two upright pillars supporting the bobbins containing the single thread to be double twisted. J, a projecting slat, containing the leading wires to receive the threads from the cocoons in the pan D.

After considerable inquiry for cocoons in this section of the country, we were enabled to obtain a bushel that had been, two years ago, sent on to this city, from one of the Southern States, for a market. In consequence of there being no demand for them, they had been put aside as a worthless article. They were in a box rendered tight by paper pasted over the openings at the joinings of the boards. Some of the cocoons were perforated by an insect not unlike the common moth; but generally they were in excellent order.

All the practical information we had had, was from seeing Mr. Brooks exhibit his machine in operation a few times. In connection with another person, whose opportunities of practical knowledge were no greater than our own, we took a peck of the cocoons, 485 in number, and weighing ten ounces. Without assorting them, as we should have done, we put a handful of some 20 or 40 into water about boiling hot—took a small broom and pressed them into the water—found the floss silk adhering to the broom—gathered the silk from the broom, and kept drawing the silk until a fibre ran off singly and evenly from each cocoon—lifted these running cocoons from the water with an instrument not half so convenient as a skimmer, and placed them in a winding basin partly filled with heated water—served other cocoons in the same manner until we acquired two threads of about 100 fibres or cocoons, and carried the threads through the guide wires, between the rollers, to the bobbins. Thus prepared, we began to wind by turning the wheel, keeping up the thickness of the thread by supplying additional cocoons, and collecting and attaching the ends of those that had broken. After a sufficient quantity was on the bobbins, took them and placed them in the upright posts, and carried the ends through the guides and rollers to the bobbin, for the purpose of doubling and twisting. Replacing the bobbins with two more, we then, by turning the wheel, wound, doubled, and twisted the silk at one operation. Thus continuing, we obtained from the peck 1¼ ounces of fine sewing silk, which, when deprived of the gum, by being several times boiled in soap suds, weighed one ounce. Besides this, there were 4¼ ounces of floss silk obtained from the gathering of the silk from the broom, from cocoons that would not wind, and from those that had been injured by insects, or imperfectly formed. These 4¼ ounces, after having been cleansed in soap suds, weighed 3 ounces. This floss silk is to be carded and spun for stockings and other purposes.

The sewing silk being very fine, did not, owing to the improper adjustment of the machine, give a sufficient twist; in other respects it was pronounced a fair, saleable article. When it is considered that we were entirely *green* at the business, were several times obliged, as soon as we got into operation, to omit our labors for another day, and were not in possession of the conveniences for producing a good article, our readers will perceive that the manufacture of silk for common domestic purposes is not more difficult than to spin flax or wool, which was formerly done by the females of almost every farmer's family in the country.

Our lowest estimate of the value of the bushel when made into sewing and floss silk, is $4,50 Our information, however, relative to its price, is derived from books and personal inquiries, and is extremely varied, and often contradictory. One thing is very certain, that if $2 50 to $3 50 per bushel for the cocoons is a remunerating price to the farmer, the manufacture of them into silk in his own family must be very profitable.

The machine, the drawing of which accompanies this article, is the invention of Mr. Adam Brooks, of Scituate, Mass. It is admirably adapted for families, when sewing silk is intended to be made. The one we used is a beautiful machine, made of mahogany, in a substantial and workmanlike manner. It cost $28. Those of hard but less costly wood, and thoroughly made, are $25. With an additional bobbin, $30 and $26.

Machines made by the inventor may be had of the agents, H. Huxley and Co. 81 Barclay street.

RELATIVE CLAIMS OF AGRICULTURE.—Mr. Whitaker's views correspond so well with our own that we cannot refrain from giving another extract.

"But agriculture," says he, "contributes liberally to the constant demands, and not to the occasional wants of society—to the indispensable and never varying necessities of mankind at large, and not simply to the incidental and extraordinary calls of individuals. In this point of view, therefore, Agriculture prefers claims to a far higher consideration than either Law or Medicine. And if the question were put, which is best calculated to enlarge and liberalize the mind, the decision, I imagine, must again be in favor of Agriculture—of Agriculture, however, not degraded to a despicable rank, but raised to that high elevation where good sense and a just philosophy would place it. Even its humblest duties, I maintain, are performed under circumstances favorable to the development of a refined enthusiasm:

'——— Ask the swain
Who journeys homeward from a summer day's
Long labor, why, forgetful of his toils,
And due repose, he loiters to behold
The sunshine—gleaming as through amber clouds
O'er all the Western sky; full soon I ween,
His rude expressions and untutored airs,
Beyond the power of language, will unfold
The form of beauty smiling at his heart.
How lovely! how commanding!'"

NEW-YORK AMERICAN.

JANUARY 25—FEBRUARY 1, 1834.

HOME INTELLIGENCE.

NAVY APPROPRIATION BILL.—We publish this as a bill of general interest and which has become a law.

AN ACT making appropriations for the naval service for the year one thousand eight hundred and thirty four.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled, That the following sums be appropriated for the naval service for the year one thousand eight hundred and thirty-four in addition to the unexpended balances of former appropriations for similar objects, viz.

For pay and subsistence of the officers of the navy and pay of seamen, one million four hundred and eighty-seven thousand two hundred and forty-four dollars and twenty-one cents.

For pay of superintendents, naval constructors, and all the civil establishments at the several yards, sixty-one thousand one hundred and eighty dollars.

For provisions, four hundred and fifty thousand dollars.

For the repairs of vessels in ordinary, and the repairs and wear and tear of vessels in commission, five hundred and ninety thousand dollars.

For medicines and surgical instruments, hospital stores, and other expenses on account of the sick, forty thousand dollars.

For the improvement and necessary repairs of the navy yard at Portsmouth, New Hampshire, forty thousand seven hundred dollars.

For the improvement and necessary repairs of the navy yard at Charlestown, Massachusett, eighty-six thousand three hundred dollars.

For the improvement and necessary repairs of the navy yard at Brooklyn, New York, fifty-seven thousand fifty dollars.

For the improvement and necessary repairs of the navy yard at Philadelphia, six thousand five hundred and fifty dollars.

For thh improvement and necessary repairs of the navy yard at Washington, twenty-nine thonsand five hundred dollars.

For the improvement and necessary repairs of the navy yard at Gosport, Virginia, one hundred and eight thousand two hundred and fifty dollars.

For the improvement and necessary repairs of the navy yard at Pensacola, twenty-six thousand dollars.

For ordnance and ordnance stores, ten thousand dollars.

Fer defraying the expenses that may accrue for the following purposes, viz:

For freight and transportation of materials and stores of every description; for wharfage and dockage, storage and rent, travelling expenses of officers, and fuel and candles, to officers other than those attached to navy yards and stations, and for officers in sick quarters where there is no hospital, and for funeral expenses; for commissions, clerk hire and office rent, stationary and fuel, to navy agents; for premiums and incidental expenses of recruiting; for apprehending deserters; for compen sation to judge advocates; for per diem allowances to persons attending courts martial and courts of inquiry, and to officers engaged in extra service beyond the limits of their stations; for printing and stationary of every description, and for books, maps, charts and mathematical and nautical instruments, chronometers, models and drawings; for purchase and repair of fire and steam engines, and for machinery; for purchase and maintenance of oxen and horses, and for carts, timber wheels, and workmen's tools of every description; for postage of letters on public service; for pilotage and towing ships of war, for cabin furniture of vessels in commission, and for furniture of officers' houses at navy yards; for taxes on navy yards and public property; for assistance rendered to vessels in distress; for incidental labor at navy yards, not applicable to any other appropriation; for coal and other fuel for forges, foundries, and steam engines; for candles, oil, and fuel, for vessels in commission and in ordinary; for repairs of magazines and powder houses; for preparing moulds for ships to be built, and for no other purpose whatsoever, two hundred and ninety five thousand dollars.

For contingen expenses for objects not hereinbefore enumerated, four thousand dollars.

For pay of the officers, non commissioned officers, musicians and privates, and for subsistence of the officers of the marine corps, including arrearages and increased pay under the act, second of March one thousand eight hundred and thirty-three, one hundred and thirty-five thousand eight hundred and eighty dollars, and twenty-five cents.

For subsistence of non commissioned officers, musicians and privates, and washerwomen of said corps, serving on shore, nineteen thousand two hundred and thirty-one dollars and eighty cents.

For clothing, twenty-nine thousand three hundred and fifteen dollars.

For fuel, nine thousand and ninety-eight dollars.

For contingent expenses, including arrearages, nineteen thousand dollars,

For transportation and recruiting, five thousand dollars.

For medicines, hospital stores, and surgical instruments, for officers and men serving on shore, two thousand three hundred and sixty-nine dollars and seventy-one cents.

For balance due Lieutenant Colonel Anderson, nine hundred and fifty-four dollars and twenty-two cents.

For the erection of barracks for the marines stationed at the Navy Yard, Brooklyn, New York, thirty thousand dollars.

For carrying into effect the acts for the suppression of the slave trade, including the support in the United States, and for a term not exceeding six months after their arrival in Africa, of all persons removed from the United States under the said acts, five thousand dollars.

That so much of the sums appropriated by the act of the twenty-eighth May, eighteen hundred and thirty, for the relief of Alexander Claxton, as still remains due and unpaid, and which has been carried to the credit of the surplus fund, shall be, and the same is hereby, reappropriated.

Destructive Fire at Herkimer!—The Herkimer county Court House and Jail, together with the Rev. Mr. Spinners' Church, in the village of Herkimer, were entirely consumed by fire on Sunday night. The fire took place in the prisoners' room by accident, but was not discovered in season to arrest its progress.—[Albany Daily Advertiser.]

Destuctive Freshet.

Extract of a letter from a gentleman residing in Charleston, Kanawha county, to his friend in this city, dated January 15th, 1834.

"I wrote the above several days ago—but owing to an unusual freshet in the Kanawha River, the mail did not leave our office. On Saturday, the 11th instant, it commenced raining, which continued until Sunday night, and our whole country was inundated with water. The Kanawha was within four feet of the rise of 1822, which was the greatest freshet ever known in the river. Many of the bridges are swept away, and all have sustained damages. I understand that the water was four feet deep on the floor of the Coal River Bridge, but it is said did not move it. The new bridge at Campbell's Creek was taken *up* the creek (by back water.) I have understood that they have been attempting to tow it back, and let it settle down, as the water falls, in its original place, and that they have hopes of succeeding. The embankment has also been injured. You will know where the water was in Charleston, when I tell you it was 18 inches deep on the floor of the dining room of Captain Wilson's tavern.

"Two negroes went into Mr. L. Ruffner's coal bank. The entry is somewhat lower than the interior, where they worked. The water rose over the mouth of the bank, before they were aware of its approach. They attempted to escape, but found that the long entry, of more than one hundred yards, was closed, and the water still advancing on them: They retuned to their room, and got on a pile of slate in the highest part thereof, and in more than mid-night darkness, awaited the *sure* approach of death. In this situation they remained *two days and nights.* As soon as the water fell enough to let a *craft* enter the bank, one was sent in, but it could not pass the lowest point. The steersman called to them; they answered, and were requested to be patient"—"the river was falling." What pen could describe the feelings of these poor fellows, when they first heard the sound of human voices! It is supposed, tnat the air, which was confined in the room by the mouth's closing first, prevented the water from filling it. But it is not certain that is the fact; or that the room, in which they were, was not above the water level.

"A considerable quantity of salt has been lost. Mr. B. sat and watched the approach of the water to within three or four inches of his salt-house, in which he had 30,000 bushels, that he could not remove. But the Dove returned with the Olive Branch. The waters began to recede."—[Rich. Enq.]

La Normandie is the name of a new packet ship of the Havre line, which is now preparing to sail on Saturday next, 1st proximo. This vessel was built during the past summer, at Hartford, in Connecticut, under the superintendence of Mr. Isaac Bell. She is between 5 and 600 tons, of fine model for both speed and burden, and of great strength. Her main cabin is on deck, and it is finished with remarkably good taste. The whole is painted white, very highly varnished, with a light gilt moulding around the panneling. The state rooms are large and commodiously arranged; and from the after part of the cabin designed for ladies, a private stairway descends into another smaller cabin between decks, admirably adapted to one or two families that might desire to be together on the voyage. One of the most striking novelties in this ship is the arrangement for the helmsman. The wheels are sunk in the quarter deck, constituting the roof of the main cabin, so that by throwing up a leathern covering, in the shape of a gig top, the man at the wheel is completely protected from the weather. His position too is behind, instead of beside, his wheel, as is generally the case, and hence he has more control over it. Upon the whole, it is difficult to conceive of more, or more ingenious arrangements for comfort—if such a term can be predicated of any thing belonging to the sea—and safety, than is to be found in *la Normandie*—and so God speed her!

Great Sale.—The Company owning the "Old Line" of Liverpool packets, have sold six of the ships to a new Company, the Agent for whom are Messrs. Goodhue & Co. The ships sold are the Britannia, Caledonia, North America, South America, Europe, and Hibernia. The price is $36,000 each. They are comparatively new. The Pacific and New York, the oldest of the fleet, are not included in the sale. The Agents on the other side are Baring, Brothers & Co. That great house, we understand, are making arrangements to extend their business in this country, where they say—they have made more money and lost less in comparison with the whole amount, than in any other country.—[Jour. of Com.]

The old line of Liverpool packets, we are desired to say, will be completed by the addition of the Orpheus and the new ship Columbus, now building, by Messrs. Webb & Allen, under the direction of Captain Cobb. These ships will take the place of the Pacific and New York.

The arrangement of the Line, which will take effect on the 1st of March, will be announced by the middle of next month.

The annual report of the Inspector of Pot and Pearl Ashes for the city and county of New York, was made to the Senate on Friday. Whole number of pounds inspected, including scrapings, 18,692,945; estimated value, $823,383 31; inspector's fees, deducting expenses, $4,304 85. The inspector adds that he does not know of any legislative provisions that would have a tendency to improve the quality or increase the quantity.—[Alb. Argus.]

Appointments—*Saturday, Jan.* 18.

New York—Isaac Sayre, measurer of grain, in place of Aaron Howell, resigned; D. C. Colden, notary public, in place of Thomas Shankland, resigned; Jesup Jermon, notary public, in place of Evert A. Banker, resigned; Theodore Allen, commissioner of deeds, in place of John L. Creger, deceased; Thomas Frost, measurer of grain, in place of Wm. Frost, resigned; Henry H. Orrington, public notary, in place of Wm. Orrington, resigned; Edward M. Luther, culler of staves and heading, in place of James Rauvene, removed; Daniel Deitrick, inspector of sole leather, in place of Henry Leek, resigned; Edward Hueston, for pilot by way of Hell Gate, in place of Samuel Leaycraft, removed; John H Bell, notary public, in place of Thomas M'Cready, jr. deceased; Richard W. Blatchford, a commissioner of deeds, in place of Mitchell Sanford, resigned; Jas. Rogers, measurer of grain, in place of Samuel Bleecker, removed.—[Albany Argus.]

[*From the Baltimore American of Saturday.*]

Destruction of the Warren Factory.—A little before 12 o'clock on Thursday night the extensive Cotton Mill belonging to the Warren Manufacturing Company, about 15 miles from the city, was discovered to be on fire. The flames first appeared in the highest story of the building, near the belfry, about twenty minutes after the watchman had taken his regular half-hourly round through the rooms. He immediately attempted to give the alarm to the workmen by ringing the bell, but the second pull of the rope caused it to sever at the place where the fire had already reached it. This circumstance created some little delay in rousing the workmen, but they were nevertheless at the premises in a comparatively short time, and using every possible exertion to check the fire, but without, we regret to add, being able to accomplish it. In a short time the whole building, with all its valuable machinery, was reduced to a heap of ruins. None of the adjoining buildings were injured.

The cause of the fire cannot be traced. It broke out in a garret room containing nothing combustible, and but little used, and the *watch-clock* indicated the regular half-hourly presence of the watchman until the alarm was given. The fire was discovered at an early stage, but the combustible nature of the building, rendered still more so by the quantity of oil used on the machinery, baffled all efforts to subdue it. By far the most distressing circumstance connected with the event, is the fact that between seven and eight hundred persons derived, directly or indirectly, their support from this establishment, and are thus suddenly deprived of employment at this very inclement season.

We understand that the building and machinery were insured to the amount of sixty-three thousand dollars in several offices in the Eastern States. The property destroyed, however, could not be replaced for $100,000.

LITERARY NOTICES.

No. XII.

MONROE Co. (M. T.) DEC. 5, 1833.

I write to you from a log cabin on the banks of the river Raisin, about 30 miles above Monroe. The worthy farmer, upon whose premises I am quartered for the night, sits with his child on his knee, in the chimney corner, with a prosing visitor, pipe in mouth, opposite, while the good woman is engaged doing some "chores" at the further end of the apartment, which is of course the chief cooking, eating, sitting, sleeping and smoking chamber in the house. My dormitory, I have a shrewd suspicion, is to be in a loft, from which a lad is at this moment descending by a ladder with some corn for my horse. The black walnut stand, upon which I am writing, occupies the centre of the room; and as I am at this moment keeping up my share in a desultory sort of conversation going forward around me, and at the same time trying to check the undue familiarity of a large bull-dog—who, like other individuals, has become troublesome from being admitted too rapidly into my intimacy—you must not expect me to be very coherent in detailing the impressions of the day.

It was a gloomy, lowering morning, with occasional flakes of snow driving through the harsh atmosphere, when I started from the village of Monroe, well mounted on a stout roan, whose figure and action would command thrice the sum in New York that the animal cost me here, and whose performance to-day speaks well of the dependence I may place upon him to carry me through my arduous route into the interior of the Peninsula. It was with a feeling of almost boyish pleasure that, after the slight taste I have had of stage travelling from Pittsburgh to Cleveland, and from Detroit to Monroe, I found myself once more in the saddle, with the full privilege of regulating my motions as I choose. The delightful mode in which I travelled with S—— from New York to Wheeling, in a barouche, with two led horses under the saddle, was indeed, both for pleasure and solid comfort, not to be surpassed. But now, though I have neither the agreeable friend, the attentive groom, nor the luxurious carriage, to enhance the gratification and relieve the weariness of travelling, the feeling of independence still remains. And though I confess I could not suppress a sigh this morning, when packing up the linen and books which, with my trunk, I shall not see for a month to come, yet that pair of saddlebags beneath my feet, though conscious only of a shirt apiece, flanked as they are by my light fowling-piece, which that weather-beaten worthy is at this moment curiously examining, and my leggings, which are drying upon those andirons, make me feel as rich as did that famous soldato Dugald Dalgetty himself, with his single change of chamois leather and iron overcoat, while handling his arms and surveying his compact appointments from the back of the doughty Gustavus.

My road led, from the moment of leaving the village, along the banks of the Raisin, whose serpentine current flowed fuller and clearer the further I advanced into the country. The land at the same time gradually rising, and though never hilly, yet leaving the stream, far enough below to form a bluff of some 10 or 15 feet, where the timber land rose from the rich bottoms on its margin. After riding thus for about 20 miles along the river, where the log cabins gradually became fewer and farther between, I struck through a wood so dense that it seemed to terminate the settlements in this direction, and then at a sudden turning of the path, I came at once upon the "oak openings." It would be difficult to convey an idea of the pleasing effect of such a surprize. Imagine yourself emerging from a New Jersey swamp, and coming at one bound upon one of the English Parks which Puckler Muskaw so admirably describes. Clumps of the noblest oaks with not a twig of underwood, extending over a gently undulating grassy surface, as far as the eye can reach; here clustered together in a grove of tall stems supporting one broad canopy of interlacing branches, and there rearing their gigantic trunks in solitary grandeur from the plain. The feeling of solitude I had while in the deep woods, deserted me the moment I came upon this beautiful scene, and I rode on for hours, unable without an effort to divest myself of the idea that I was in a cultivated country. Towards evening I found myself in the thick forest again, and was glad as the night closed in darkly over a road where at every step my horse would either sink to his knees in mud, or trip over the stubs of the newly cut saplings, to be overtaken by a mail-rider, with his leathern charge, on horseback. The lonely lad was as glad of company through the forest as I was of a guide; and he willingly taking the lead, I flung my bridle on my horse's neck, as the skies became blacker and blacker, and touching him smartly with the spur, away we went through the woods together. "Take care of that tree, sir; look out for the mud-hole"—called my goblin usher at each moment, as we tramped and splashed along, where I would have defied the Evil One himself to have seen any thing but the impenetrable dark. I heeded him not; but bending low in the saddle to avoid the boughs, and glueing my knees to the surcingle, I surrendered myself to my destiny, and attended to nothing but keeping my horse as close to the heels of his file-leader as possible. At length we reached a clearing, and a few yards of better road brought us to a log-cabin. The family were at supper when I entered; and sitting down with the rest, I helped myself with an iron spoon from a dish of suppawn, and fishing up a cup from the bottom of a huge pan of milk, I poured the snowy liquid over the boiled meal that rivalled it in whiteness. The corn from which it is made, my host tells me, grew to the height of 16 feet, the stalks being of a blackish green color. From the same soil, a black sandy loam of easy tillage, wheat as high as a man's head has been raised; the produce from a single grain being from 300 to 400, and in one instance one thousand and twenty-six. I see symptoms of sleeping in those around me; and having no right to monopolize this important apartment, will conclude this elsewhere to-morrow.

TECUMSEH, LENAWEE Co., DEC. —.

The cockloft, as I expected, was my place of rest. I stumbled over a pile of corn, and struck my head against the roof, almost as soon as I had got my body fairly above the trap-door. I found a clean bed, however, and it was a very sociable place, after all; for there were four persons besides myself stowed away in the different corners. So soundly did I sleep on my straw pallet, that the night seemed to me but just begun, when the red glare of a tallow candle flashing over my eyes, with the tap of the mail rider on my shoulder, told me that dawn was breaking, and that we must be gone. The landlord brought out a lantern for me to mount by, and we had proceeded far on our journey before the faintest streak in the East indicated the waking of the sun.

It was about 7 o'clock, when stopping to water at a little shantee, I found several laboring people at breakfast within; and the mail carrier consenting to wait for me, I sat down to table at once with the rest. The fare consisted of hot rolls and tea, with large pieces of pork swimming in its own gravy, with a plate of noble potatoes, that pulverized when you touched them. My plate was heaped at once with all, while each one present vied with the other in civility to me. They were talking of a horse, for which $100 had been paid, when I entered; and an English poaching gun I have with me, not worth a fifth of the sum, caught the fancy of the owner. He insisted upon "swapping with me on equal terms," and seemed much hurt when I refused not only to "trade," but expressed no inclination to see his favorite steed. I replied, however, so good humoredly to his entreaties to trade, that he still persisted in them until taken aside by one or two of those present. He then came up to me in an altered manner—"I hope, sir, that I don't insult you by wanting to buy that curisome gun, for I dont mean to be uncivil not at all inthe least." Upon assuring him that I had taken no offence, he rejoined that if his horse was not worth $300 he would eat him, but he had set his heart upon that gun and must have it. I did not like to expose myself to the temptation of seeing the horse though of course I did not think for a moment of taking advantage of the honest yeomans caprice, but had it not been a present from a friend abroad I should certainly have given my ardent acquaintance the toy which caught his fancy after what followed. "I say mister, said he musing for a moment "do you want a farm, eh! a house, eh! I'll trade you as good a tavern stand two miles from this as there is in this county." I got away at last as he followed me to the door and held my reins to mount, by promising to leave him the object of his desires in my will.

The charaster of the country continued for some miles much the same as that passed over yesterday, though the river gradually degenerated into a narrow muddy stream. The log cabins which always occurred in the heavily timbered district, had nothing to distinguish them from each other, and the openings were as silent as if man and beast had deserted them; though I saw a couple of deer in one instance feeding afar off and met a settler who was carrying a wolf, just caught in a trap by the road side, on his shoulders. I was struck too at seeing no less than three pet fawns near different houses, within a few miles of each other. In one instance a tall hound was sitting erect beside one of these gentle creatures, who was licking the ears of the enemy of his race. The incident reminded me of an anecdote I heard told by an old hunter in one of the wild districts of New York. His favorite hound one morning, when the deer were in the red coat and not fit to hunt, came to him while chopping, and made signs for his master to follow to a thicket not far off, where the woodman discovered a fawn so entangled that it could not escape. It was so small and feeble that he carried it away with ease in his arms, while the doe, which was near at hand, followed her bleating offspring. The dog accompanied him with great apparent joy, and, though one of the keenest of his kind, would drive off the grown deer only a few rods and then return at once to keep an eye on his master's movements. The fawn was taken home, and, being fed continually by the children, soon went tame about the house The dog, however, insisted upon sleeping with it, and could scarcely be separated from his long eared friend, and when it met with the usual fate of pets and died prematurely, a month or two after, poor Ring was inconsolable. The worthy English settler, whe had been a game-keeper in the "*auld* country," in his day, added, that he had the curiosity to dress a piece of the venison, which, fond as hounds are of that food, was rejected with disgust by the canine mourner.

One of the other fawns which I saw, would, with the group attendant, have made a pretty subject for Fisher's pencil. He had thrust his head into a bevy of rosy little girls, who were making "sand pies" on the bank of the river, and as his delicate hoofs threatened to demolish the rural substitutes for the card houses of parlor bred urchins, one of the little architects, covering her work with her hands, kept the intrusive animal at bay with her head; the long yellow locks of which streamed over his bluish crest while the perverse beast twisted his snout under and insisted upon licking her face.

It was still early in the afternoon when I arrived at this place, and my surprize was not slight after coming through a region where every mile seemed to lead me further from ci-

vilization to light suddenly upon a pretty village laid out with broad streets, and having an excellent tavern on a public square in the centre. I entered the town through an oak opening. When a few hundred yards from the village, I passed a half dozen graves, apparently dug at random among the trees, though each was ornamented with a handsome head stone. I have since learnt that the towns people, with a degree a of consideration which might well be emulated in larger cities, are already making arrangements to lay out and plant a public cemetery for the use of every religious denomination in the place. At Monroe I believe they have already done the same thing. There, indeed they had an ample number of guests for the narrow house, before even the abodes for the living were built. The bones of the butchered Kentuckians bleached till within a few years on the banks of the Raisin, and a gentleman of the place told me that he had often walked over the execution ground and handled skulls that were cloven with the tomahawk. There is also an Indian cemetery about 12 miles from Monroe, where the skeletons of the dead can be plainly seen through the crevices of the stone pile heaped above them. I am told that they are wholly unmolested by the white inhabitants; partly from feelings of decency, creditable to themselves, and partly, perhaps, from fear of the roving relatives of the deceased, who return yearly and observe the condition of the spot, with a jealous eye. Not far from this place, resides an old settler, who has killed a half a dozen Indians with his own hand. Three or four of them he shot with his rifle from his cabin, when they surrounded it to capture him; and the stories told of his encounters with the others, might better be detailed by a novelist than a letter writer. I have seen nothing of the natives yet, except a couple of Wyandott squaws, though the French settlers with their elf locks and blanket capotes, might at a distance be well taken for aborigines. I think a little of starting at once for the rapids of the Grand River, and spending a week or two among the Ottowas, who, I am told are still there in considerable numbers, and preserving enough of their original habits to make them fair specimens of the Michigan Indians. They tell me however that a guide will be indispensable, and having already offered one in vain a fair compensation, I may be compelled to give up the attempt.

The Grand river or Washtenong is, as I have before mentioned, the largest stream in the Peninsula, being 270 miles in length, while the country watered by it consists of about 7,000 square miles. It has a good harbor at its mouth, on Lake Michigan, for vessels drawing 8 feet water, and it is navigable for those drawing 4 feet for more than 30 miles from the Lake: while further inland it traverses a country represented, by my informant who has recently returned from surveying in that distant region, as of immense fertility. There are also beds of gypsum and lime, with sound stone quarries and mines of iron and with indications of the existence of copper, to be found on its tributaries, while a hundred mineral springs—which seem to abound in this country, for I have already seen a half a dozen—enrich the central region where its branches interlock with the bright waters of the Huron on the eastern, and the myriad of streams and lakes which form the sources of the Kecklamazoo on the western, side of the Peninsula. They tell me here that it would be in vain for me to attempt to cross the country from Chicago to St. Louis alone at this season of the year, when, if the vast prairies are covered with snow, I should be lost beyond a certainty, and as I am now compelled to remain until the new mail contracted for commences running on the first of January, I shall employ the intermediate time in seeing as much of Michigan as possible. I find myself among the most intelligent population of the middle class (the bone and sinew of a community) I ever mixed with, and every one seems so contented, I may even say delighted, with his adopted home, that I am catching a little of the spirit of those around me, and am eager to visit more intimately scenes which one would suppose were Elysian, by the way in which people talk of them. I find myself as yet only 35 miles from Monroe by the new U. S. road, though the route I travelled was 65.—When you next hear from me I shall be father in the interior, and hope to be able to tell you that I have seen a hill or a rock, the sight of either of which would, I confess, be refreshing in spite of all the charms of oak openings, vine hung streams, and grassy bottoms. H.

PETER PARLEY'S BOOK OF POETRY.

PETER PARLEY'S BOOK OF BIBLE STORIES. Boston: LILLY, WAIT & Co. Agent in New York, J. WILEY.—These are two little volumes, in the usual style of Peter *Parley*, adapted for children and youth, and adorned? with wood-cuts. The Book of Poetry is composed chiefly of short and well selected pieces. The Bible Stories, is made up of two little English books, "Bible Letters" and "Gospel Stories," with some few alterations and omissions.

DENTOLOGIA, A POEM; by SOLYMAN BROWN, A. M. with Notes Practical, Illustrative, Historical, &c. By ELEAZAR PARMLY, Dentist. New York: PEABODY & Co.—A poem "on the diseases of the teeth, and their proper remedies!" Was ever Muse invoked in such behalf before? This may well seem a very natural exclamation, and yet, when one goes beyond the first blush of the subject, it will be found that inspiration is sought, and found, too, by the poet, in lovely woman's face, of which two rows of pearl form not the least lovely feature. In serious truth, Mr. Brown has here treated a subject, unpropitious certainly, with no common talent, while, in the notes of the friend to whom he dedicates his poem, there is much that may be read with both profit and pleasure, by the admirers of, and those admired among, the fair sex.

LIFE AND WRITINGS OF MAJOR JACK DOWNNIG, &c. written by himself: 2d edition, 1 vol. Boston, *Lilly Wait, Colman & Holden.*—This volume contains capital humor and satire; though much of it, from its local application, referring to quarrels in the Maine Legislature, will be less relished here than in New England. There are appended to it—and that, considering they are denounced as spurious, seems unfair—several letters of *our* Major Jack Downing. The whole of these—which, bearing on general affairs as they do, and revealing with such intimate knowledge, the doings of both cabinets at Washington, and of the interior of the *Gineral's* palace, are universally acceptable—will, we are glad to hear, soon be published here.

MECHANICS' MAGAZINE, for January.—Among the diversified and truly interesting contents of this number, we remark a drawing and description of Dr. Church's Steam Carriage for ordinary roads, now in practical operation in England; and a clever paper on Mr. Burdon's steamboat. Mr. Verplanck's address, too, before the Mechanics' Institute, is given at length, and will, we hope, be generally read and meditated.

Accompanying this No. we have received a large and handsome 8vo. volume, comprizing all the numbers of the past year. It is a volume which working men in all departments, and men having any turn for mechanical or scientific enquiries, should possess.

HEATH'S BOOK OF BEAUTY FOR 1834.—We have just seen this beautiful volume, which *W. A. Colman* has received by the George Washington. It is in all respects of engraving and printiug, worthy of its name. He has also vol. 1. of "A Miscellany of Natural History," containing the history of Parrots, and giving all their varieties in colored engravings; a well executed work.

*** At the commencement of the last year I offered to send the American *tri-weekly* instead of *semi-weekly*, together with two of my periodicals, in exchange to those who would publish my advertisements of the different periodicals. In consequence of this notice, our exchange list was increased to 165—to all, or nearly all, of which I sent the American *three times* a week and also *two* of my periodicals.—I soon found that the expens would be greater than I had anticipated, as the *paper alone* for this number of exchanges would cost me over $500 for the year, yet I had made the offer, and would of course continue it through the year—as I have done. I however find it *too expensive* to coutinue to send as heretofore. The circulation of my PERIODICALS, (upon which the expense falls,) will not warrant it, and I must, therefore, notwithstanding the uniform kindness with which they have been treated by those to whom they have been sent, materially *reduce* their *exchange list.*

The *semi-weekly* American will hereafter be sent in exchange as *formerly*, (or until January, 1835,) to those who will publish the following advertisements for me to the amount of the difference of price. *New-York, January* 20, 1834.

VOL. III. OF THE RAILROAD JOURNAL AND ADVOCATE OF INTERNAL IMPROVEMENTS is published once a week in quarto form, with 16 pages to each number, at $3; or in *semi-monthly* form, of 32 pages, stitched in a cover of colored paper, at $4 *per annum, in advance.* The *first* and *second* volumes of the Journal may be had in *two* parts to the year, either stitched in *covers* or bound in boards, for the price of putting them up, 25 or 75 cents per volume. Those in covers may be sent by mail to any part of the country, the same as a magazine. Published at No. 35 Wall st., New-York, by D. K. MINOR, Editor and Proprietor.

THE MECHANICS' MAGAZINE AND REGISTER OF INVENTIONS AND IMPROVEMENTS is now just commencing its *second* year. It has, thus far, been received by those for whom it is designed, in a manner highly complimentary to its projector and proprietor. It will be continued by him in a manner not only *equal*, but altogether *superior* to that of the first year. It has drawn forth many valuable correspondents, with the assistance of whom and those who may hereafter contribute to its columns, together with the ability of Mr. JOHN KNIGHT, formerly, and *for several years*, proprietor and publisher of the LONDON MECHANICS' MAGAZINE, who is engaged, and has been, for the last 10 months, as Editor of this work, the proprietor has no hesitation in saying that it will be found worthy of an extended irculation and a liberal support. The *first year*, or *two* first volumes, *having been stereotyped*, may now be had either in numbers, or bound in boards—either at *wholesale* or *retail*. Price $1 50 per vol. in numbers, or $1 75 in boards, or $3 per annum. A liberal discount made to the trade. Office 35 all st., N. Y.

THE NEW-YORK FARMER AND AMERICAN GARDENER'S MAGAZINE is now in its *seventh volume*, or second volume of the *new series*. It is published once a month, in quarto form of 32 pages to each monthly number, or 40 pages to each number, to those who pay $3 *in advance*. The last volume may be had either stitched in a *cover*, so as to be sent by mail, or in boards. Price, *stitched*, $3 25; in boards, $3 50. Published at No. 35 Wall street, N. Y.

D. K. MINOR, Proprietor.

Jan. 22, 1834.

D. K. Minor also publishes the NEW-YORK AMERICAN, *daily*, *tri-weekly*, and *semi-weekly*.

Also, the PLOUGH-BOY, once a week, at $1 50 per annum.

A QUARTERLY JOURNAL OF AGRICULTURE AND MECHANICS will hereafter be published at the same office. Each quarterly number will contain about 300 large octavo pages. Price, $5 per annum, in advance.

☞ All Letters and Communications for the above publications, may be addressed, *free of postage*, to

D. K. MINOR.